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[Founded in 1849 as the "Journal of Gas Lighting."]

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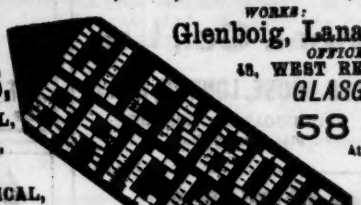

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EDITORIAL NOTES.

Problems of To-Day.

WITH a rapid glance at the aggregate progress made by gas undertakings in the area covered by the North of England Gas Managers' Association, Mr. Arnold W. Branson, in the Presidential Address he delivered last Friday to the members, passed immediately to some of the more important problems and interests of the present time. All on which he touched are going to take part in moulding the future of the gas industry, to which future we look with a well-warranted hopefulness, though appreciating that to a large extent the industry has to feel its way by tentative working over the new ground to which it is moving. The difficulties and anxieties of the times would be much lightened if those responsible for the management of gas undertakings could universally say that they had the sympathy, interest, and help of all whom they employ. Unfortunately, this is not the case. One of the first things requisite but unrealized in the great reformation of our industrial life of which we have heard so much was to bring about a new outlook and new methods for labour. But to-day, what do we see largely about us? The same struggle for getting out of industry all that labour can do, without taking into account whether it is justified or whether it will inflict an injury upon the industry giving employment. The methods of doing this are characterized by the same old crudeness, but intensified. The President emphasizes these features, and alludes to recent events. Obviously some gas workers do not know what constitutional method means, or if they do they do not act up to it. We will not insult their intelligence by saying that they do not know what honesty and loyalty mean; but that all gas workers act up to honesty and loyalty was not attested when the men in important gas areas went out on strike after their representatives and those of the employers had arrived at an agreement on a national basis. Mr. Branson rightly says it is a farce to speak of national agreements when gas workers in a district whose representatives have been parties to an agreement refuse to stand by them, and come out on strike. There is warning in the address for such men; and it will depend upon them whether the warning materializes. If they do not abide loyally by agreements, then it will drive undertakings to sever themselves from the Federation of Gas Employers, which will mean the weakening of the power of the Federation, and the instituting of inability to negotiate and discuss on a national basis. The result would be to put the workers back in their old position, and to re-establish direct negotiation between employer and employed. However, it is anticipated that zoning and grading will contribute largely to avoiding this. There is another point. It is that excess in wage claims is one of the best possible stimulants to the adoption of economizing machinery; and it is now more necessary than ever for employers to study very closely on which side is the balance of advantage between labour costs and the capital, maintenance, and running costs of machinery. The new conditions have substantially altered the aspect of this question. Every movement of wages makes more compulsory the quest for economy, and for ascertaining how costs in relation to production can be lightened.

The President gives point to this from his West Hartlepool experience; and this brings him to another consideration. With changing conditions, increased gas consumption, and the vista of potentiality opened up by the Gas Regulation Act, the problem of works extensions and plant selection becomes more difficult. Furthermore, it is not wise in some circumstances to continue, in view of prospects, remodelling and extending carbonizing plant on a congested site. At one time all gas undertakings were sequestrated units. Then the idea grew that this was a mistake, and that they were units constituting an entity. This is fortunate. But though the industry has oneness in many things, geographical situation and local circumstances make uniform practices undesirable and even impossible. This applies, as the President shows, to the determination as to whether it is an act of wisdom to remodel and extend carbonizing plant on a congested site. The temptation is very great in these costly times; and complete gasification and water-gas plant offer a solution of the difficulty of congestion. Not, however, universally. Conditions pull one against the other. Along the North-East Coast, secondary products return a high percentage of the costs of manufacture. Therefore, at the present time secondary products must there predominate in consideration. But what of the future? It is necessary to look round. Will the miners be energized to produce so much more coal for increased pay that the supply will enable the price to be reduced, and so drag down in its train the values now being received for gas coke along the North-East Coast? Mr. Branson does not look for such an augmentation of coal supply that coke will in the north-east area be materially affected in value. That has to be proved by time. Even so, there are other considerations. The output of gas coke is likely to be a diminishing quantity, with the use of coke-oven gas, with the general adoption of steaming, with the installation of more water-gas plant, and with the application of complete gasification processes where the values of coke cannot reach the levels that exist in the lucky places of demand for coke for export. All these are matters which have to come into account when considering what is best to be done in regard to renewals or extensions of gas-producing plant. Tar is another (although not so important a) factor. In this there are not such wide differences in value in the country as there are in respect of coke. It is generally doing well in these times, and will continue to do so. The price has moved markedly upwards from what used to obtain; and where gas undertakings enjoy participation, through co-operative tar distillation and vending the products, in the profits beyond the crude material, they are doing better still. The prospects for tar are good, with the arrears of road spraying, and the use of tar fuel (such as creosote) for steam-raising. Creosote, too, is being heavily exported; and there is also the recovery of benzole for motor-car purposes and for the dye industry. The future of sulphate of ammonia is clouded. But all these are matters which have to be put into the financial balance before coming to a decision as to plant selection and change of site. Of all the considerations, however, increasing gas demand and tar prospects appear to be the least speculative.

Benzole and Naphthalene.

ANOTHER particularly interesting feature of Mr. Branson's address is his reference to benzole extraction, in conjunction with which process he uses a naphthalene extractor, which not only improves the quality of the benzole, but maintains the efficiency of the wash-oil for a longer period. Though the President records a good success and the mutual advantage of benzole improvement and a reduction of naphthalene complaints (which is not general where benzole-washing is practised), the compulsory extraction of benzole from the gas is something against which he sets his face. Price

improvement for the crude material and the increasing demand for motor spirit, in his view (as in that of other gas men), will cause washing for benzole to become a general practice, given the elimination of flat-flame burners. The benzole plant at West Hartlepool is capable of dealing with 10,000 gallons of creosote per day; and its high efficiency is partly attributable (as already intimated) to the small naphthalene extraction plant which Mr. Branson has installed. He gives a table showing the average naphthalene content at the inlet and outlet of the scrubber during the twelve months of last year. One of the best figures is a reduction of 7·86 grains per 100 c.ft. of gas in October—from 8·6 grains to 0·74 grain, or a reduction of upwards of 90 p.ct. In normal working, the quality of the benzole is seldom below 82 to 83 p.ct. at 120° C.; the highest test recorded being 90 p.ct. When the naphthalene extractor is not working in conjunction with the crude still, the quality of the benzole falls to 69 or 70 p.ct. at 120° C.; and the oil becomes thick and unfit for use considerably sooner. This is valuable evidence. It is evidence that will lead other gas engineers who are extracting benzole, and are troubled with naphthalene, to investigate whether, by the simple method described, they too cannot realize the dual benefits of improved benzole working and naphthalene reduction. These benefits cannot be the monopoly of West Hartlepool. Since the plant has been in operation there, 150,000 gallons of benzole have been recovered, or an average of 1·67 gallons per ton of coal carbonized.

The Gas Regulation Act under Examination.

The success of the Gas Regulation Act depends upon—first, the Board of Trade, in conjunction with the prescriptions of the Gas Referees; and, secondly but yet equally, upon the earnestness and the work of every individual officer in the gas industry. Every official must get well impregnated with the spirit of the Act, and become well-grounded in all the intentions of, and the possibilities and opportunities offered by, its provisions. Because of this, it was recently suggested in the "Journal" that, at every meeting of District Associations this autumn and coming winter, the Act should be introduced for discussion; and so we are glad to see that, after our Scotch friends, the North of England Gas Managers' Association had it up for consideration last Friday. The introduction of the subject was made through a paper by Mr. T. P. Ridley, the Secretary and Commercial Manager of the Newcastle-on-Tyne Gas Company; and the paper, far-reaching in its thoughtfulness and suggestion, we advise every official in the gas industry to read with studious care, for it will be helpful not only in guidance, but in annulling some of the misconception which exists in, we fain believe, relatively few quarters in the industry. As Mr. Ridley says, the Act in its entirety has not received the commendation of the whole industry. Some think its provisions have not gone far enough; others that the conversion that is going to be made by it in the industry's practices is unnecessary. In our opinion, both views are wrong. It was better for the Act not to specify terms that would have been beyond redress without an amending Act, but to leave the power of revision in the hands of those who will be responsible for the initial terms. As to the second point, the only objection that has as yet been raised is as to the sale of thermal energy in place of volume—the former of which will be measured by one continuously recording instrument for all consumers alike, instead of only volumetrically by a great number of instruments. More on this point presently.

We do not say the Act is without blemish; but we do assert, with Mr. Ridley, that "the Act, looked at as a whole, "is, in all the circumstances, quite good." That is the major opinion in the industry. It provides for the restoration of the financial stability of the industry; and it opens up avenues for development and efficient working. What is good for the industry is good for the consumers and the workers. There is also something to be thankful for in that the operation of the Act is in the hands of one department, and that eventually the industry will have the bulk of its legislation done through a body that will amass specialized knowledge of its requirements, and which knowledge will be brought to bear in giving decisions upon applications and the opposition of those who for various reasons endeavour to obstruct the progress of gas concerns, especially those carried on by joint-stock enterprise. This will be infinitely better than submitting schemes and having opposition cases presented to mutable Select Committees, some of the members of which could not define a cubic foot, and much less a B.Th.U. At the same time, the ever-accumulating knowledge will serve as a palladium to the interests of local authorities and consumers alike. Justice will be administered with knowledge; and, this being so, we hope it will help to instil a spirit of sweet reasonableness in the minds of local authorities towards those who by private enterprise carry on the public service of gas supply.

Reverting to the second point, and to those who would prefer to continue to sell by volume. We are afraid that the gas men who hold this view are those who do not want the temporary trouble of the change, and would rather sacrifice the lasting benefit. Mr. Ridley prefers to sell heat units rather than cubic feet; and the best thinkers in the industry see the advantage of this. Those who do not want to sell on the thermal basis still desire to be able to "declare" the calorific value that their economic and local conditions render the best possible. The Act has sought to institute a measure on which the consumer will pay, and which will be the same throughout the country. The declared thermal value will vary greatly in all parts of the country. Adjoining districts may be selling in the one case 420 B.Th.U. gas, and in the other 520 B.Th.U. gas. Charging on the 1000 c.ft. basis, the price of the former might not be, in the circumstances of the undertaking, considerably lower than the latter; but the difference in thermal value per 1000 c.ft. would be 100,000 B.Th.U. By charging per therm, or 100,000 B.Th.U., we shall have in the gas industry a co-ordination of values which has never obtained before; and in this there will be considerable advantage. The principal objection, however, appears to be that the consumers will not understand what they are paying for. The consumers never did know this. They will do so now, and especially if gas officials help them to master the simple definition of a B.Th.U. As Mr. Ridley says: "If changes "were never made because of difficulties, very little pro-"gress would be made in anything;" and to this we would add that there are not many good things going that can be obtained without some effort. It is for gas undertakings to help the consumers to understand what they are paying for; and we believe, with Mr. Ridley, that they will eventually understand better what they are paying for than they do now. How will those who are unfavourable to the change, because of their anxiety over the low level of intelligence of their consumers, explain how or why it is the electricity industry has made the progress it has done? How many electricity consumers can explain a unit of electricity, or a kw.-hour? If gas consumers can be brought to appreciate that one B.Th.U. is the amount of heat required to raise the temperature of water 1° Fahr., then they will better appreciate the relative values of a unit of electricity and a therm, when informed that the former has a potential thermal value of 3420 B.Th.U., and the latter of 100,000 B.Th.U.; and that to equal the potential value of the therm 29·24 units of electricity are needed. There is considerable value in making the consumer understand the new basis of charging, and all the effort that is expended in doing so will be abundantly repaid.

Mr. Ridley shows what has to be done in making applications for Orders under section 1 of the Act. The rules and the schedule have been published in the "Journal," and in this issue are reprinted the forms of application and notice, which complete the official documents until we get the rules applying to applications for Special Orders. In the paper, Mr. Ridley comments suggestively on many points, particularly in relation to the schedule; and this part of the paper should be very carefully read; as it is clear that the arithmetical adjustments that will have to be made in filling-up the schedule will constitute the heaviest part of the work. Particularly will this apply to capital charges, maintenance, and repairs, and to those undertakings that may be subject to a violent price-slip in respect of exported coke.

Regarding the topic of price movements per therm, which is at the present time under discussion in our columns, Mr. Ridley agrees with Mr. H. E. Ibbs as to 0·2d. per therm being a better working figure than ¼d. He also expresses the hope that the Act is sufficiently wide to enable the Board of Trade to alter the principles of the existing sliding-scale in such a way as to allow the employees to partake in the benefits of reductions in price below the standards—as in the case of the South Metropolitan Company under the system of profit division which has in their case superseded the sliding-scale.

Revision of Gas Business Policy.

THE members of the Eastern Counties Gas Managers' Association at their meeting last Thursday—with the new President, Mr. A. W. Sumner, in the chair—discarded the plan of having set papers, and had a lively and fruitful discussion on subjects and problems affecting gas distribution and selling. With the intention of moulding thoughts as well as giving direction to the discussion, some short monographs were prepared by Mr. J. W. Auchterlonie, Mr. J. H. Troughton, Mr. Thomas Glover, Mr. Frank Prentice, Mr. John Terrace, and Mr. E. F. Keable, on different though cognate topics. As an experiment, the innovation was successful in one regard—it brought out a lot of interesting experiences and suggestions. But in two respects the plan did not shape precisely to modelled lines. The chief points made by the writers of the introductions were largely overlooked. For instance, in Mr. Auchterlonie's contribution, he made the point as to what would be a fair charge for meter-hire in these times of dear money, and costs of maintenance and renewal; but not one of the speakers settled upon this important question. Principles had greater attraction than concrete facts. Then again, with all the engineering ability on the Committee, a false estimate had been made as to the length of programme that would suffice for the meeting; and the result was that the contributions of Mr. Prentice, Mr. Terrace, and Mr. Keable found that interest was either flagging, or the members were tired, or time was an obstacle to further speech. We believe the plan could be made a big success, if the rule was observed that the scope laid down by the introductions must be adhered to, and if there was not a plethora of subject-matter. The reply may be anticipated that it is always difficult to predetermine what subjects will at a meeting stimulate the best discussion.

The distribution problems of the day are many; and they will increase in number with the coming of the heat-unit basis of charging. In the circumstances of to-day, without further change, the problems jut out in fresh form at every point—from the gasholder, through gas conveyance, measurement, and use. A great revision of policy and terms is necessary. The policy and terms of the pre-war days have to be recast to have consistency with these times. Take what Mr. Auchterlonie said on meter charge rates and repairs and maintenance of meters, and the same as to what Mr. Troughton said on the same points regarding cookers. When the costs of capital, appliances, materials, and labour were of the order that existed before the war, gas managements stood nearer to rent-free this and that, and many services could be rendered at a low rate or without direct charge. And gas, being relatively low in price, could the better bear the inclusive charge that had to be made for all services which were not covered by a direct charge. Present costs have removed gas managements from this position; and the greater the removal, the greater the necessity for examining policy to ascertain in what respect it must be revised. The first line in the new policy is that gas must be, as an agent for lighting, heating, cooking, and power, at as low a price as possible. To make the price as low as possible, it must be shorn of all extraneous or avoidable charges. This in our judgment is essential from three points of view: First of all, for commercial or competitive reasons. Secondly, because, when the price of gas includes rents, repairs, renewals, &c., the best gas-consuming customers are worse off than the small ones. Thirdly, the capital, maintenance, and renewal charges for meters and gas-using appliances will in time become more or less fixed, and will not be subject to the same extent as we hope gas will be to the influence of economies, reduced market prices for manufacturing materials, and so forth; and therefore in all cases where the amount of dividend payable depends upon the price at which gas is sold below the standard, the share or stock holders must suffer some disadvantage from gas prices being saddled with all that is embraced in meter and stove rental. It does not matter so much in a maximum price company, if the maximum be one that affords a decent margin of cover. The defence of the gas shareholder must have in future something more concrete about it than in the past, and a little less of those abstract ideals which are said to give satisfaction to the consumer through (as he thinks) his pocket, but which in reality he pays for indirectly. In considering the revision of policy, gas companies will not have to ignore the capital provider by concentrating attention wholly upon the gas consumer. It is better appreciated to-day that the extension and stability of the industry and the maintenance of good service to the gas consumer have to rely largely upon the satisfaction of those who will supply capital, and who to-day can find abundant employment for it on good terms outside the gas industry.

To give this satisfaction, and to keep the price of gas at as low a figure as it can be, if the principle is followed that every tub should stand on its own bottom, the separate charges for the hire of meters, cookers, &c., must be at a figure commensurate with the capital, maintenance, and renewal charges. And this applies as much to prepayment meters, fittings, &c., as to ordinary meters and cookers. The allowable rates of charge for prepayment service are limited. In some recent Special Acts, however, they have been raised; and the Board of Trade have the power under the Gas Regulation Act to make any modifications proved to be really desirable. But those who determine the policy and the charges of gas undertakings must discriminate between what is legitimate and what is not legitimate, to form the basis of hire charge to the consumer, and what is expedient and what is inexpedient in these times. For example, much has been said in latter years as to the growing defects in, and rapid degeneration of, gas-meters. The weight of proof so far is that the gas supply is to blame. To make the charge for meters (by the way, Mr. Auchterlonie considers a fair meter-rent would be 15 p.ct. on the net cost—that is 7 p.ct. for interest, and 8 p.ct. for repairs and maintenance) bear the cost of the more rapid depreciation would be unfair. Another example—this comes under the head of expediency—is that the inspection and adjustment of consumers' appliances should be a charge upon the gas supply. This is a matter of appliance efficiency contributing to gas-business stability. The policy affecting rentals for meters applies as much to rentals for gas-consuming appliances.

We admit fully with Mr. Troughton that the best method for dealing with gas appliances is, wherever possible, to get consumers to purchase outright or to hire-purchase; but we also agree with Mr. W. W. Townsend that it would be a fatal error to "make" people pay cash down for everything. In our opinion, the hiring system must not be permitted to remain dormant a day longer than is necessary. As was pointed out in our editorial columns last week, the municipal electricity undertakings have now statutory power to hire-out; and they are in several places taking steps to do it. Equal convenience to householders must not be barred from the side of the gas industry. There is significance for company owned gas undertakings in the fact that, where there is municipal government of electricity undertakings, there merit and economy are not the sole considerations in deciding between gas and electricity in connection with the housing schemes. This was a point, among several others, that was brought out in connection with Mr. Terrace's contribution, in which he dealt largely with the capital expenditure involved in supplying under the housing schemes. Generally speaking, in the regulation of policy in dealing with consumers, the principles enunciated by Mr. Thomas Glover leave little to be desired; and Mr. Keable's contribution urges that a perfect study should be made of showroom arrangement and practice, so as to tempt or induce people to become the owners of goods such as are displayed, or with which demonstration is made. Some showrooms have sufficient characteristics about them to have a really deterrent effect.

Prepayment Tokens or Threepenny Coins.

In the early part of the discussion on distribution problems at the meeting of the Eastern Counties Gas Managers' Association, Mr. W. W. Townsend stated certain objections that he finds to the use of tokens for prepayment meter supply. It seems to him, however, that something might be done as an alternative to continuing prepayment by means of bronze coins. His suggestion is that the gas industry should consider whether it would not be possible to get the Mint to produce a nickel or aluminium coin of the realm of the value (say) of threepence which would be suitable to operate meters. The amount of copper locked up now in coin gas-meters is enormous; and the weight that has to be collected at the present price of gas is tremendous. Another consideration is that the threepenny nickel or aluminium coin would also give relief in the case of those meters that cannot be set below a certain amount.

Meter Deterioration and Gas Quality.

In another part of the discussion at the same meeting, there was much said about the increasing rapidity of meter deteriora-

tion, and the large augmentation of defects. This cannot necessarily be attributed to what is being done now, but rather to what has been done. But what has been in this respect should not be to-day. There can be little question that the accelerated speed of meter failure and defect has been due to the composition of the gas. There has been nothing to controvert the findings in this regard of Messrs. Taplay and Parkinson as the result of their researches for the Life of Gas-Meters Joint Committee. The proper way to arrest damage is to ensure, as Mr. Thomas Glover says, that coal gas is made containing in itself sufficient lubricants for the meters. So far as blue water gas is concerned, Mr. W. W. Townsend points out that a slight carburetting or passage of water gas through the same purifiers as the coal gas will neutralize the effects of sulphur dioxide. Mr. F. A. West stated that he was allowing so much air to go into his purifiers that the finished gas contained 3 to 4 p.ct. of oxygen. This, of course, is very bad practice; but Mr. West was driven to it owing to the small size of his purifiers and the large increase in gas consumption. Oxidation of the meters is sure to follow such a condition. However, the damage that has been caused to meters cannot be completely cured, but it can be relieved. One speaker had not found any benefit to accrue from the oil-spraying of meters; but other people have. This may be due to the differences in the treatment causing the damage to which the meters have been subjected.

Hardening of Meter Leathers.

Regarding the points Mr. F. A. West made in his remarks, it will be seen that he consulted Prof. M'Candlish, Professor of the Leather Industries Laboratories at the Leeds University, as to the condition of the leathers in the meters at Newark. In the course of the correspondence that Mr. West had with Prof. M'Candlish, the latter made the following interesting statement: "If the old leathers contain an excessive amount of oxidized oils, it is quite conceivable that these may have a hardening effect on the leather; and if these oils were removed by washing with benzole, petrol, or preferably a mixture of equal parts of either of these solvents, with carbon tetrachloride, the oxidized oils would be removed from the leather, and a fresh coating of almond oil could be applied. If such treatment does not produce a distinct softening of the leather, it seems probable that the hardening is due to the deterioration of the leather under the prolonged influence of coal gas, or more particularly, its impurities." On this Mr. West remarks that in his case it is useless to spray the meters with an ordinary solar distillate; and he has found there is no benefit in this in actual practice.

The Coal Datum Line.

This week is a highly critical one for the country; and it is expected that it will decide whether or not the trial of increased wage payment on production is to be made in the coal industry. Monday and Tuesday the miners were voting on the mineowners' offer regarding the advance in wage payments for an increased output on the datum line proposed. Mr. Smillie has thrown his weight into the balance on the side of peace, by urging the miners to accept the proposal for the space of three months, during which examination should be made of the whole ground, with a view to arriving at a durable and permanent scheme. But the men are being counselled not only by those on the side of peace, but by those who make a business of being factious; and their advice is to vote against payment on production, and to insist on an unconditional advance. How the voting will go in consequence of this cannot be foretold. The result, it is expected, will be issued to-day, and considered at a delegates' meeting to-morrow. One of the singular aspects of the hostility to the datum line is that the miners are fully aware that, if they produced at the same rate as they did in the March quarter, the 2s. advance per day would be theirs immediately.

Farthing or 0·2d. Movements per Therm.

In this issue, Mr. H. E. Ibbs replies to the criticisms made in last week's issue on his proposal that a convenient price movement per therm would be 0·2d., instead of a farthing. Mr. T. P. Ridley, the Secretary and Commercial Manager of the Newcastle-upon-Tyne Gas Company, in the paper on the Gas Regulation Act that he read before the North of England Association on Friday, expresses agreement with Mr. Ibbs.

Model Forms.

On a later page, there are published the model form of application for Orders under section 1 of the Gas Regulation Act, and the model form of notice which has to be given under the terms of the Act. With the publication of the rules, the schedule, and now the model forms, we have only to await the rules and instructions referring to the application for Special Orders. There will not be any decisions or inquiries just yet. The first notices of application for Orders were not to be in before Oct. 1; and any local authority or person has a period (which is to be not less than twenty-one days) in which to make representations in regard to an application.

Sliding-Scale or the South Metropolitan Plan.

It will be noticed that the President of the North of England Gas Managers' Association (Mr. Arnold W. Branson) likes the look of the system put forward by the South Metropolitan Gas Company for supplanting the sliding-scale. He makes a suggestion. He thinks that the system for the division of profits will commend itself to many, except probably as to the proportions in which the surplus profit is to be divided. He considers that justice has not been done to the old proprietors. In his view when the House of Lords Committee declined to grant the Company power to pay 6 p.ct. on the old stock, they should, when dealing with the scheme for the division of the surplus profits (taking 11d. per therm as the basic price), have treated the holders of the existing 5 p.ct. stock more equitably by allotting to them an additional one-eighth of the surplus until such time as they were in receipt of a 6 p.ct. dividend, when the extra one-eighth would revert to the consumers. The latter would in the meantime be receiving five-eighths of the total, which seems to Mr. Branson to be a generous share, having regard to the cheap capital employed in their service, and the comparatively low basic price fixed by the Act. Mr. Ridley in his paper indicated that he would like to see labour made participants in profits accruing through the sliding-scale.

Gas Oil Prices.

A few days ago our contemporary the "Petroleum Times" contained in its market report the information that gas oil was a "firm market, with prices approximately 1s. 6d. per gallon, net and naked, *ex* wharf. No doubt with the coal situation what it is, there is a pretty good demand for gas oil. But, generally speaking, as the price goes up, the demand for it will go down, and so will its use. Working on the thermal basis, the gas industry will prefer, where it makes water gas, to keep the oil consumption to the level of bare necessity; and in some cases that level is marked "*nil*."

Suggestions from Illinois.

Among various devices for the consumption of gas industrially to which attention is drawn by the Industrial Gas Department of the Public Service Company of Northern Illinois, is a gas-heated melting and coating tank. This has been adopted on the works of a manufacturer of asphalt products. The operations of melting, saturating, and coating the material are carried out in steel tanks at a temperature of about 450° Fahr. At first the necessary heat was obtained by burning gas under the tanks; but observation of the effects of hot-oil circulation in the processes of other industries convinced the Public Service Company that its extension to the asphalt treatment operations named was perfectly feasible. Coils were placed in the tanks, and through these oil, heated by gas, was circulated. The effect of thus using the oil as a radiator of heat was an immediate increase of some 25 p.ct. in the output of work, with no increase in the consumption of gas. Another device employed in various manufacturing operations has also been adapted to the conditions of gas burning as an automatic temperature controller. It consists of a heating-element made-up of an iron tube, 14 in. long, which is lined with a second tube made of brass. The latter is sensitive to changing degrees of temperature—it expands and contracts. Placed in the top of a heat-treatment chamber, the movement of the brass tube actuates a spring which operates a valve. The latter releases to the flame more or less gas, as the situation demands. A dial is set at the temperature figure required by the operation, and thus the heat desired is maintained steadily. In the case of a time-valve which is being adopted by large consumers of gas, the "turn-on" and "turn-off" action is accomplished automatically, by means of a clock arrangement. This results in a saving of labour. Experiments are being conducted by the company with a burner made of lava, to be employed when gas is used in large quantities. So far in operation it is said to display marked merit.

PERSONAL.

Mr. FREDERICK JOSEPH WEST, C.B.E., the General-Manager and a Director of West's Gas Improvement Company, Ltd., was elected an Alderman of the City of Manchester at the Council meeting on the 6th inst. Mr. West was Senior Councillor, and was elected a representative of the Newton Heath Ward on Feb. 14, 1905. He therefore has had over 15½ years' experience in Council work. During this period he has served on the Electricity, the Rivers and Main Drainage, Improvements, and Buildings Committees, and has for the past fourteen years held the position of Vice-Chairman of the Rivers and Main Drainage Committee. He has also served on a number of Special Committees, and is a Corporation representative on the directorate of the Manchester Ship Canal.

Mr. WILLIAM DOWNIE, Manager of the Strichen Gas Company, Aberdeenshire, has been appointed Gas Manager at Comrie.

Mr. MATTHEW R. A. KENNEDY, who has been connected with several Scottish gas-works, including those at Banff, Perth, and Port-Glasgow, has been appointed Manager of the Ballinasloe Gas-Works, Ireland.

OBITUARY.

ROBERT ORMISTON PATERSON.

It is with a feeling of real loss that we have to record the death, on the 8th inst., at his residence, Gatcombe, Eastfield Park, Weston-super-Mare, of Mr. Robert Ormiston Paterson, who was formerly for many years Engineer and General Manager of the Cheltenham Gas Light and Coke Company. The deceased gentleman, who was 75 years of age, had a slight stroke in the spring of last year; and though he got over the attack with hardly any remaining effects, he subsequently showed increased feebleness. Last Thursday night, while sitting in his chair, he had another attack, from which he did not regain consciousness, and passed peacefully away just after midnight.

Mr. R. O. Paterson, of Cheltenham, and Mr. T. O. Paterson, for many years at Birkenhead, were sons of the late Mr. James Paterson, who was for some quarter-of-a-century Manager of the Warrington Gas-Works, and became well known as the author of a useful work on the "Lithology of Gas Coals." After having been Assistant for several years to Mr. W. Esson (at that time Manager of the works), Mr. R. O. Paterson became Engineer and Manager of the Cheltenham Gas Company about 1870; and from this position he retired at the end of 1913, when he went to live at Weston-super-Mare. When recording this event in the "JOURNAL," it was remarked that, though reserved in disposition, he had ever been looked upon as a leader, and always as a charming and amiable companion, friend, and counsellor; while with regard to his technical management of the Cheltenham Gas-Works, it had been a matter of surprise to the modern advocates of up-to-date carbonization how years ago he—with stop-ended brick retorts, regenerative furnaces, and dry mains—could show results quite equal to what, under more modern conditions, was now being done elsewhere.

The affection and esteem in which our friend was held in Cheltenham was shown in 1895, on his completion of 25 years' service with the Company, when the officials and employees took the opportunity of placing on record their appreciation of the cordial relations that had during the whole of this time existed between him and his subordinates. He was then presented with an epergne. Again when he retired from his position as Engineer and General Manager he entertained the staff and employees at a farewell dinner, and was presented with a silver tea and coffee service and tray, which had been enthusiastically subscribed for by all grades of the employees, as well as by the Directors, auditors, and officials. With this handsome gift was an album containing an address, in which the subscribers testified their deep sense of the unvarying high-minded, consistent, and impartial attitude which had ever marked his conduct in dealing with the affairs of the Company on the one hand, and the Company's employees on the other. It was added that unfailing devotion to the interests of the Company, coupled with consideration, courtesy, and kind thought for the welfare of those under his management, had characterized the whole period of his service. With the close of his career under the Company came the inauguration of the new works which were described in the "JOURNAL" for March 10, 1914.

As President of the Midland Association in 1881, and Chairman of the Birmingham Medical Committee, it was Mr. Paterson's privilege to ask the old British Association of Gas Managers (of which he became a member in 1870) to accept the medal that had been subscribed for in order to encourage original research; and he then accorded to Mr. Charles Hunt (who was President of the British Association of Gas Managers that year) the credit for the original suggestion. Two years later Mr. Paterson was the President of the Gas Institute, which had been evolved from the old Association; and his address on the occasion was a model of concise survey and perspicacity. In every possible way, through the organizations of the day, Mr. Paterson did a good part in fostering the technical and commercial work of the industry. He was a strong believer in, and therefore supporter of, co-operative work in every branch. In November, 1914, he was elected an honorary member of the Midland Association—a kindly feeling which he greatly appreciated.

Readers do not need to be reminded that the names of Paterson and Cheltenham are still joined together; for Mr. James Paterson succeeded to his father's position on his retirement. With him and with all the other members of the family deep sympathy will be felt in their bereavement.

The death is announced, at the age of 75 years, of Mr. JAMES M. M'CUBBIN, who was at one time Gas Manager at Port Glasgow, and subsequently Chief Engineer to the Monte Video Gas Company, from which position he retired about fifteen years ago.

The death occurred, on Sept. 29, at the age of 80, of Mr. HENRY HAIGH, of Clayton, near Bradford, who was Cashier-Bookkeeper for 37 years to the old Clayton, Allerton, and Thornton Gas Company, and the Bradford Corporation Gas Department, who subsequently took over the Company's works.

At his residence, Heathfield Hall, Handsworth, there passed away last Thursday Mr. GEORGE TANGYE, the last survivor of the four famous engineer brothers who went to Birmingham from Cornwall in the middle of the last century, and established the great business at Soho which bears their name. He was in his 85th year. As long ago as 1852 Richard Tangye accepted a situation as a clerk in the engineering works at Birmingham of Mr. Thomas Worsdell. The next year he was joined by his brother George, also as a clerk; and James and Joseph followed shortly afterwards, the former as foreman and the latter as a leading workman. The brothers did not, however, remain long with Mr. Worsdell, for they soon started in business for themselves as machine makers. After bringing out several important inventions, they turned their attention to the manufacture of steam-engines. At that time only a few small engines were made by any one firm in the course of a year, apart from those turned out by agricultural engineers; but Mr. James Tangye designed a simplified form of stationary engine with interchangeable parts, a novelty which soon attracted the attention of manufacturers in all parts of the world. Business improved; and it became necessary to remove to larger premises. This led to the erection of the Cornwall Works at Soho, close by the historic foundry of Boulton and Watt. Joseph and James Tangye ultimately retired from the firm; and business was carried on by Richard and George, until it was converted into a limited Company in 1881, under the title of Tangyes, Ltd. Mr. George Tangye remained in a supreme position; and under his direction there were many further developments in the manufacture of steam-engines, gas-engines, boilers, pumping machinery, machine tools, and other things. The prosperity of the concern continued when Mr. George Tangye became Chairman of the Company, in succession to his brother, Sir Richard Tangye, who died in 1906. Mr. George Tangye's generous gifts to Birmingham included his fine collection of relics of Boulton and Watt.

The Yeadon Revolving Retort.

Reference to the Yeadon revolving cast-iron retort for the continuous carbonization of fine coal for the production of briquettes and light oils, has been made in the "Gas Age," on information obtained from Mr. W. Armstrong, of Montreal. The lower heats employed permit of the use of a variety of materials which could be carbonized with a big yield of volatile constituents, and without breaking them up. This refers particularly to such substances as oil shale, oil sand, &c. The Yeadon retort has been designed to handle material of this kind, or fine bituminous coal, with the view of recovering bye-products. There is placed within a brick setting a cylindrical cast-iron retort, with longitudinal corrugations, which is revolved by worm-gear located outside. Into the retort the dried, crushed coal is fed at one end; and the sticky granular coke-coal is extracted at the other end by a worm discharge. Since the cast iron (or cast steel for higher heats) retort is conical in shape, larger at the discharge end, and has prominent corrugations, the fuel is stirred continuously, and moves automatically towards the other end of the retort. The corrugations also increase the heating surface and strengthen the retort. The yield claimed per ton of coal is 30 to 40 gallons of oils, and 20 lbs. of sulphate of ammonia. Tar is used in briquetting, gas is employed in heating the retort, and about 1500 lbs. of coke for briquetting.

Wood Carbonization in Canada.—The wood distillation plants working in Canada in 1918 numbered thirteen, having a capital of $3,612,573, with products valued at $7,235,217. The number of employees was 677. The crude wood alcohol had a selling value at the works of $981,535; and the refined, of $1,531,356. The charcoal was valued at $1,575,701.

Wages and Output.—There has been drawn-up by the Federation of British Industries, in view of the present serious position, a statement on the "Future of Wages and Prices." The complete document is deserving of careful consideration; and it is to be hoped that heed will be paid to the call for increased output, and to the opinion expressed that the present position of trade is the inevitable result of the workers' attempt to secure a higher share of the national wealth merely by increasing money wages without any relation to work done.]

GAS REGULATION ACT, 1920.

MODEL FORMS OF APPLICATION AND NOTICE.

THERE will be found in the last two issues of the "JOURNAL" the rules made by the Board of Trade with respect to applications for Orders under Section I. of the Gas Regulation Act and the information to be supplied in the prescribed form of schedule mentioned therein. We have now received from the Board the model form of application for an Order and the model form of notice of application.

MODEL FORM OF NOTICE.

GAS REGULATION ACT, 1920.

Notice of Application by the.....for an Order under Section I. of the Gas Regulation Act, 1920.

Notice is hereby given that the.....(hereinafter referred to as "the undertakers") have applied to the Board of Trade under the provisions of Section 1 of the Gas Regulation Act, 1920, for an Order providing for—

(*a*) the repeal of any enactments or other provisions requiring the undertakers to supply gas of any particular* [illuminating] [calorific] value and the substitution therefor of power to charge for thermal units supplied in the form of gas; and

(*b*) the modification of the statutory or other provisions affecting the charges which may be made by the undertakers by substituting for the* [standard] [maximum] price per 1000 c.ft. now authorized with an addition to meet increases in the costs and charges of and incidental to the production and supply of gas by the undertakers since June 30, 1914, a* [standard] [maximum] price per therm (*i.e.*, 100,000 B.Th.U.).

The* [standard] [maximum] price now authorized in respect of the supply of gas by the undertakers is.....s.....d. per 1000 c.ft., and the price which the undertakers have asked the Board of Trade to substitute for this price in accordance with paragraph (*b*) above is.....s.....d. per therm.†

A copy of the application made to the Board of Trade and of all the documents submitted therewith may be inspected, free of charge, at the address below at any time during office hours [‡and may be purchased on payment of the usual charges for copying].

Any local authority or person desiring to make representations with regard to the application may do so by letter addressed to the Assistant Secretary, Power Transport and Economic Department, Board of Trade, Great George Street, London, S.W.1, and posted not later than §.....

A copy of such representations must at the same time be sent to the undersigned.

[Signature]

[Address of office within limits of supply]

[Date]

* Insert the word which applies.

† If more than one standard or maximum price or any differential prices (other than for gas supplied through a prepayment meter) are now authorized, the notice should be altered accordingly.

‡ The works in brackets should be inserted in the notice served on the local authority.

§ Insert a date not earlier than 21 days after the date on which the publication and service of the notice will be completed.

MODEL FORM OF APPLICATION.

GAS REGULATION ACT, 1920.

Application by the .....
for an Order under section 1 of the Gas Regulation Act, 1920.

The ..... (hereinafter referred to as "the undertakers") hereby apply to the Board of Trade for an Order under section 1 of the Gas Regulation Act, 1920, providing for—

(1) The repeal of any enactments or other provisions requiring the undertakers to supply gas of any particular* [illuminating] [calorific] value and the substitution therefor of power to charge for thermal units supplied in the form of gas; and

(2) The modification of the statutory or other provisions affecting the charges which may be made by the undertakers by substituting (in accordance with the provisions of sub-section (3) of section 1 of the above-named Act) for the* [standard] [maximum] price per 1000 c.ft. of gas authorized under those provisions, with an addition to meet increases in the costs and charges of and incidental to the supply of gas by the undertakers since June 30, 1914, a* [standard] [maximum] price for each therm (*i.e.*, 100,000 B.Th.U.).

The* [standard] [maximum] price per therm proposed by the undertakers in substitution for the present [standard] [maximum] price of † per 1000 c.ft. is † per therm. It also proposed that additional charges per therm should be authorized in respect of gas supplied through a prepayment meter.

The following documents are transmitted with this application:

(*a*) A schedule (in triplicate) in the prescribed form showing in detail the cost to the undertakers of supplying gas for the periods specified in the form, and a copy of the published accounts of the undertakers for the specified periods, and a statement of the price or prices charged for gas during each of those periods.

(*b*) A list of the enactments and other provisions now in force requiring the undertakers to supply gas of a particular illuminating or calorific value.‡

(*c*) A list of the statutory and other provisions now in force affecting the charges to be made by the undertakers.‡

[Address and date.]

[Signature.]

* Insert the word which applies.

† If more than one standard or maximum price or any differential prices (other than for gas supplied through a prepayment meter) are now authorized, the application should state them and also the prices per therm which it is proposed to substitute for them.

‡ *e.g.*, Sections 46 to 48 of the.....Act, 1906.
Section 20 of the.....Act, 1911.
The.....Gas (Standard of Calorific Power) Order, 1917.
The.....Gas (Temporary Increase of Charges) Order, 1919.

INSTITUTION OF GAS ENGINEERS.

Council Meeting.

A MEETING of the Institution Council was held at No. 30, Grosvenor Gardens, Westminster, on Tuesday, the 5th inst.—the PRESIDENT (Mr. Thomas Goulden) in the chair.

Some consideration was given to the preliminary arrangements for the next annual meeting, to which an invitation had been extended to, and accepted by, the Société Technique de l'Industrie du Gaz en France.

The report of the Life of Gas-Meters Committee was presented, including a statement of the action which had been taken with a view to the revision of the enactments relating to the sale of gas. A deputation representing the various interests concerned had placed before the Board of Trade proposals which the representatives had drawn up at conferences. It was believed that these proposals would be adopted. Questions relating to the proposed new standard sizes of dry meters were also reported upon.

The resignation of Mr. F. J. Bywater from the Refractory Materials Committee was accepted with expressions of deep regret, and of sincere appreciation of the valuable services which he had rendered as Hon. Secretary of the Committee. His resignation as a representative of the Institution on the newly-formed Refractories Research Association was also accepted, and Mr. W. E. Price was appointed in his place.

Letters were received from the respective Presidents of the American Gas Association and the Société Technique de l'Industrie du Gaz en France acknowledging in appreciative terms their election as honorary members of the Institution.

The deaths of Mr. Albert R. Cawley, of Cardiff, and Mr. G. W. Houston, of Crewe, were announced; and the Council's sympathy with the bereaved was expressed.

The following were approved as candidates for the next ballot. For the class of member—Mr. Harry E. Bean, of Tamworth, N.S.W.; Mr. Thomas W. E. Corrigan, of Tiverton; Mr. Stephen Hay, of Beckton; Mr. Arthur T. Howard, of Holywell. For the class of associate member—Mr. Ernest H. Clarry, of Cardiff; Mr. John H. Hornby, of Grays, Essex. And for the class of associate, Mr. John C. Frodsham, of Liverpool. Mr. Samuel B. Chandler, of Lower Sydenham, was transferred from the class of associate member to member; and the following were admitted as students: Mr. Duncan Alexander, of Tottenham; Mr. Stanley Carmichael, of Bath; Mr. Herbert D. Lees, of Hexham; Mr. William E. Stephenson, of Great Yarmouth; Mr. Frederick J. Symons, of Bargoed; Mr. John C. Viggars, of Wrexham; Mr. Gordon H. Watson, of London; and Mr. Leonard J. Weaver, of Canterbury.

The report of the Education Committee was presented and discussed at length. A communication on the subject was approved for forwarding to the Board of Education. Questions relating to qualifications for admission to the Institution were held over to the next meeting of the Council.

Temporary Increase of Charges Act.—Orders have been made by the Ministry of Health under the Statutory Undertakings (Temporary Increase of Charges) Act authorizing the Ashborne Urban District Council to increase the maximum price charged for gas from 4s. 7d. (under a previous Order) to 5s. per 1000 c.ft.; the Briton Ferry Urban District Council, from 5s. 6d. to 6s. 6d. per 1000 c.ft.; the Glyncorrwg Urban District Council, from 5s. to 7s. 6d. per 1000 c.ft.; the Lymm Urban District Council from 5s. to 7s. 6d. per 1000 c.ft.; the Newtown and Llanllwchaiarn Urban District Council, from 6s. 6d. (under a Previous Order) to 6s. 10½d. per 1000 c.ft.; the Plymouth Corporation, at Devonport, from 4s. to 5s. 4d. per 1000 c.ft., and the Rhondda Urban District Council, from 7s. (under a previous Order) to 8s. per 1000 c.ft.

ONE-FARTHING OR 0·2d. MOVEMENTS PER THERM.

FURTHER CONSIDERATIONS WITH REGARD TO THE SLIDING SCALE.

By HERBERT E. IBBS.

I WAS very interested in reading the various criticisms and comments on my article in the "JOURNAL" of the 29th ult., and was pleased to find that in the main no convincing argument was advanced to justify the adoption of the farthing, which course would, in my opinion, bind the industry to a method of charging which would be not only less flexible, but which would, I am sure, prove more difficult in daily operation. I hope to be able to convince my readers that the case for using 0·2 of a penny, rather than the farthing, is overwhelmingly in favour of the former.

Dr. Carpenter's fear lies in the direction of introducing a new terror for the majority of people. But has he not overlooked the fact that the "damned dots" will occur on practically every account in connection with the number of therms consumed? Is it not, therefore, more reasonable to express the price also with the aid of a decimal, rather than have a multiplication which is complicated by the introduction into the calculation of both decimals and vulgar fractions?

One has only to look at the two following methods of charging to appreciate the point:

$$\frac{15{,}700 \text{ c.ft.} \times 475}{100{,}000} = 74{\cdot}575 \text{ therms} \times 13\tfrac{3}{4}\text{d.}$$
$$74{\cdot}575 \quad \text{,,} \quad \times 13{\cdot}8$$

I venture to say that in almost every case where the farthing would appear, the first step that anyone with any knowledge at all of arithmetic would take would be to immediately decimalize the fraction, with the inevitable consequence that two decimal places instead of one would be introduced.

With regard to Mr. Day's contention that in pre-war days it was unusual to vary selling prices by so small a sum as 1d. per 1000 c.ft., I have had the facts turned up in connection with the South Metropolitan and my own Company, as they should surely be symptomatic of the whole industry in this respect. I find that out of a total for the two Companies of twenty-five movements in price during the period from 1893 to 1913, no less than thirteen of these were of one penny.

As to the adjustment of the slide dividend necessitated by the adoption of a fixed fraction of a penny for movement in price rather than that of the actual equivalent price according to the calorific value of the gas originally supplied, I am afraid it would be impossible to avoid small fractions of a penny coming into the calculation in the first instance. I do not suggest for one moment that there should be any haggling over these decimal parts of a penny, as I feel sure that the authorities could easily adjust such trifling differences to the nearest penny. In Mr. Day's table, he happens to show calorific values which, taken together with the slide of 2s. 6d. p.ct., result in no greater fraction being involved than ¼d. Mr. Day, I am sure, would not suggest for one moment that every adjustment would invariably work out on such simple lines.

Coming now to the article by "Engineer," I am glad to say that I am fully in agreement with him in regard to the majority of what he says—the matters touched upon by him being very fully considered and very thoughtfully stated. The only real difference I have with "Engineer" is where he assumes that I require an adjustment of the slide dividend as the quality of supply changes. I hope I did not convey that impression in my article, because it was certainly not my intention. I am fully aware, in the first place, that once the new standard price is fixed per therm, there will be no necessity for subsequent alteration on account of variations in calorific value. The slide dividend will need no adjustment unless a fraction of a penny is used for movement in price that differs from the actual price equivalent to 1d. per 1000 c.ft. on the basis of the calorific value of the gas supplied in the pre-war period. This is a matter which may be rather difficult to follow without a statement of some kind or other; and I therefore give one herewith which I think will illustrate my point.

The statement shows in a simple manner the process of arriving at the new standard price per therm and the operation of the sliding scale. It will be noticed that, with regard to the cost of manufacturing and supplying gas, the average of the three years to June, 1914, is indicated, as this is in accordance with the form which will be supplied by the Board of Trade. In order to obtain the therm value in this case, the cost is divided by the calorific value of the gas which was supplied during that period. The next step is the estimated cost of manufacturing and supplying gas at the present time. The cost per therm in this case will, of course, be obtained by dividing by the calorific value of the gas that is now being made. The difference between the two therm costs will be added to the existing standard (therm) price, which price must be obtained by dividing the standard per 1000 c.ft. by the pre-war calorific value of the gas. The result will give the new standard price per therm.

The table that follows shows the working of an assumed sliding scale starting with the new standard price per therm and with the slide dividend adjusted to a price movement of 0·2d., in accordance with the calorific value that was supplied pre-war.

TO OBTAIN THE NEW STANDARD PRICE OF GAS PER THERM.

Pre-war standard price	3s. 2d. per 1000 c.ft.	
Pre-war calorific value of gas (average of three years to June, 1914) . . .	530 B.Th.U.	
Present calorific value of gas . . .	480 ,,	
Cost of manufacturing and supplying gas of 530 B.Th.U. (average of three years to June, 1914)	23·00d. per 1000 c.ft. or	Per therm. 4·34d.
Estimated cost of manufacturing and supplying gas of 480 B.Th.U. (half year to December, 1920).	49·00d. per 1000 c.ft. or	10 21
	Increase . . .	5·87
Pre-war standard price . .	3s. 2d. for a gas of 530 B.Th.U.	= 7·17
	New standard price .	13·04
	Say =	13·00d.

NOTE.—The above costs are, of course, exclusive of dividend charges.

THE OPERATION OF THE SLIDING SCALE.

Slide Dividend 2s. 6d. P.Ct. for Each Penny per 1000 C.Ft. of 530 B.Th.U. Gas; Standard Dividend, 4 P.Ct.

Price of Gas per Therm.	Equivalent Price per 1000 C.Ft. on Basis of 530 B.Th.U. Gas.	On Basis of Slide of 2s. 6d. p.ct. for each 1d. per 1000 C.Ft.	With Suggested Adjustment of Slide—2s. 8d. p.ct. for each 0·2d. per Therm.
d.	s. d.	£ s. d.	£ s. d.
13·0	5 8·90	4 0 0·00	4 0 0
12·8	5 7·84	4 2 7·80	4 2 8
12·6	5 6·78	4 5 3·60	4 5 4
12·4	5 5·72	4 7 11·40	4 8 0
12·2	5 4·66	4 10 7·20	4 10 8
12·0	5 3·60	4 13 3·00	4 13 4
11·8	5 2·54	4 15 10·80	4 16 0
11·6	5 1·48	4 18 6·60	4 18 8
11·4	5 0·42	5 1 2·40	5 1 4
11·2	4 11·36	5 3 10·20	5 4 0
11·0	4 10·30	5 6 6·00	5 6 8

Movements in price.		Slide Dividend.	
0·2d.	1·06d.	2s. 7·8d.	2s. 8d.

Vide table, p. 663, Sept. 29.

The above statement will provide a practical example of the working of the table that was introduced at the end of my previous article.

ELECTRICITY SUPPLY MEMORANDA.

WHAT is the economic limit of charge for electricity for lighting purposes? Some electrical men think that it is two or three times more than it was in pre-war times, and something over for the higher efficiency of electric lamps; others are not so positive, where there is a good and efficient gas service, that they can stretch their claims out to anything like that extent. There are those who put the economic limit at 1s. per unit; while others are more inclined to go to a still higher figure. The matter was referred to at the annual meeting of the Provincial Electric Supply Committee of the United Kingdom; and from the trend of the remarks then made, it would appear that electrical men are beginning to hope that consumers (who pay for their own lamps) are deceiving themselves into the belief that what they buy from the electricity supply undertaking is not electricity, but light. If this be so, then our congratulations to the electricity supply concerns. One speaker remarked that some years ago the consumers paid on the basis of between 3 and 4 watts per candle power; while with the present high efficiency lamps, users are getting light on a very different basis. On this ground, it was felt there is justification in saying that 1s. per unit is not the economic limit of charge, and that it is due to electricity concerns to see that they are adequately paid for their service. In other words, the electricity suppliers want the economies effected by the lamps bought by the consumers to be transferred to the credit of the current supplied. The comparison of the economic electric lighting situation past and present is not correct. Since the days of the carbon filament lamps, incandescent gas lighting has not stood still. Many consumers of electricity to-day did not use it until metallic filament lamps came in; and they still use these lamps for domestic purposes. Some do employ the fictitiously named half-watt lamp; and there are those who declare that, using them for semi-indirect lighting, their accounts are just as high as formerly—the reasons being that the lamps have not an efficiency of 1 candle per half watt, and that light is lost in its conversion from direct to reflected. There were other speakers who asserted that 1s. per unit is the maximum rate at present approved by the Electricity Commissioners; and one bold individual suggested that "all" companies should endeavour to get such a rate put into force. Among incidental points, it was stated that still higher efficiency lamps are going to be placed on the market when the manufacturers think fit. What a time the ophthalmic people will have! Another

The Economic Limit of Charge.

speaker pointed to the enormous increase in capital charges. Each consumer, according to him, formerly cost 6s. per quarter in the expenditure; and now he costs between £2 and £3. The view is spreading that there are some lighting consumers who are not worth having to-day; and we question if they would be worth having if their consumption was augmented by a quantity of units at (say) 2d. for the other domestic purposes. By the way, what is the economic limit of the charge for heating?

Modern Prices for Electric-Cookers, &c.

Some kind friend has sent us a copy of a priced catalogue of a firm of makers of electric cooking appliances. The prices to-day are highly interesting. They have nothing to do with wiring and installation; and they are costs which will not help to make electric cooking popular, as we regard popularity in the gas industry. The pictures of the cookers give the impression of strength and high-class workmanship. The first illustration is of an electric-cooker which has been specially designed for small houses and tenements. The cooker is constructed of cast iron and mild steel, and is double-cased and lagged to retain the heat. The oven is only 12 in. cube, with a bottom heater, and an open-coil top heater, which is also designed to be used as a griller and toaster. Over this is a small hot closet, which in turn is surmounted by a hot-plate, measuring 18 in. by 16 in. The over-all dimensions are 18 in. wide, 30 in. high, and 16½ in. deep. The maximum loading is 4·5 kw. And the price —£30 5s., *plus* 12½ p.ct. if finished in best stove black, enamelled, and nickel plated. On the catalogue cover we read "all prices advanced 10 p.ct.," which would make the cost between £37 and £38. This for a cooker alone suitable for a small house or tenement! Another cooker (for use with which special aluminium cooking utensils are recommended) is one which would be suitable for ordinary consumers. This is supplied in four different sizes. The smallest has a height of 29 in. The oven dimensions are 12 in. by 15½ in. by 12 in., and is said to be of a size requisite for six persons. It is complete with griller and crown boiling-plate; and the cost is £36 6s. If in best nickel-plate and stove black finish, 12½ p.ct. extra is required; and there is the 10 p.ct. advance. The largest size of the same series is 39 in. in height, and has an oven 18 in. by 20 in. by 18 in. This is reputed to be suitable for eighteen persons; and the cost is £72, *plus* the 10 p.ct., and the 12½ p.ct. for the superior finish. A griller, 10 in. by 5¼ in. by 9 in. (inside measurements), can be obtained for 63s. 6d., *plus* the 10 p.ct. and the 12½ p.ct. for the better finish. A breakfast cooker 10 in. by 6 in. by 9 in. (inside measurements) can be had for 176s.; and a 20 in. wide one, with the same height and depth, can be purchased for 350s.—both prices *plus* as before. A 6 in. round hot-plate is purchasable for 97s., an 8 in. one for 109s., and a 10-in. one for 120s.—all *plus* 10 p.ct. A 1½-pint glue pot can be obtained for 73s., *plus* 10 p.ct.; a 2-pint copper kettle for 57s., and a 3 pint one for 63s., complete with plug connector. If nickel plated, the prices are respectively 69s. and 75s. Prices for current for cooking and heating are now usually 2d., 3d., or 4d. per unit. Small wonder that the electrical papers and the Electrical Development Association are busy trying to energize people into seeing that it will pay them to adopt electrical operation. It is a big job they have taken in hand.

Insuring Electrical Installations.

We know that breakdown of electrical fittings is something which has to be faced by householders when they adopt electrical operation; but we learn from a circular which has reached us that there is "continuous unchecked expenditure" on temporary repairs. We also learn that electricity users can "save many pounds a year on electrical repairs and renewal account," and at the same time have their various electrical systems always in working order by insuring with the Electric Light Insurance and Maintenance Company, Ltd. We are not surprised that electrical operation offers a lucrative field for an insurance and maintenance company; but we are wondering what the insurance charges are if on top of them "many pounds" are to be saved in a year. This infers a normal heavy account for electrical repairs and renewals. The circular points out that it is the business of the Company to relieve the insured ones of all trouble, and to take the responsibility of electrical mishaps completely off their shoulders. The claim is made that the service of the Company is cheaper, and altogether more efficient, than if the user of electrical appliances arranges for the necessary attention to electrical breakdowns. The system is apparently intended to prevent trouble by inspection. The circular does not say whether the insurance covers electrically caused fires, shocks, &c.

Failures and Fatalities.

We have not kept a record lately of all the failures of supply that have been published; but illustration after illustration crops up to demonstrate that the congenital weakness of electric plant to failure has not been eliminated by technical advance. We see that on Sept. 15, there was a three-hour stoppage of supply at Accrington; and several works dependent upon electricity for motive power had to suspend operations. Hendon churches depending upon electricity the other Sunday were deprived of illumination while the congregations were at worship; and not long ago the places of amusement at Eastbourne had a "turn" of real darkness not arranged for in the programmes. It is noticed that the Bingley District Council have decided to give the Keighley Corporation notice of their decision to refer to arbitration the question of the "repeated" failures of the supply of electricity from Keighley; and they suggest that Mr. Thomas Roles, the Bradford City Electrical Engineer, be the arbitrator under the clause in the agreement making provision for arbitration. The choice is an excellent one. Last winter, Mr. Roles had some very anxious periods owing to breakdowns. He will be able to be very sympathetic. It is also noticed that the Northamptonshire Chamber of Commerce has, at the instance of Wellingborough manufacturers, made representations to the Northampton Electric Supply Company regarding "frequent" interruptions of supply. Among recent fatalities, a curious case is that of Edward Arthur Thornley, who was employed at the Great Fenton Colliery. He was in the act of turning-off a switch, when from some inexplicable reason it exploded. Pieces of the switch struck him on the head, causing a fracture of the base of the skull. At the inquest, Mr. J. A. B. Horsley, H.M. Electrical Inspector of Mines, said he examined the ruins of the switch. He found no defective insulation in the cable; but he noticed some oil on the bottom of the switch-case. He removed the oil-box of the switch, but found no sign of defect in the switch. He thought that the explosion must have been very violent; but he could only surmise its cause. The small spark at the insulator contact might have been sufficient to ignite an explosive mixture of gas and air in the bottom of the switch-box; but although the principle adopted at the colliery had been in existence for nearly thirty years, he had never known a similar accident. He believed it was a case of pure misadventure. Mr. Horsley did not say definitely how he thought the gas and air mixture was generated; but we should imagine that local heating caused vaporization of the oil, and so produced the explosive mixture which the small spark at the insulator contact ignited.

Maximum Prices and Dividends.

We understand from the "Electrical Review" that considerable apprehension exists among electricity companies over dividends that have been allowed by the Electricity Commissioners in connection with applications for sanction to increase the statutory maximum prices prescribed in Provisional Orders. The duty of the Commissioners is to allow a reasonable rate of profit to the undertakings; and the impression is that the Commissioners have adopted as adequate a standard for dividend of 5 p.ct., and a depreciation rate of a similar amount. The electric shareholders should account themselves lucky compared with gas companies who, during the war and now, are only allowed three-quarters of their "standard" rates under the sliding-scale, which means for some £2 12s. 6d. and for others 3 p.ct. The South Metropolitan Gas Company is the only gas undertaking that has secured a revision so far by Act of Parliament; and the minimum dividend allowed on their existing capital is 5 p.ct., and 6 p.ct. on new issues of ordinary capital. The "Review" points out that electricity companies are faced with demands from new consumers, involving new capital expenditure; and it plaintively asks, How is capital to be found now for a business in which the divisible profits are limited to 5 p.ct.? The answer is to be found in the Public Utility Companies (Capital Issues) Act, which our contemporary has apparently overlooked. The Act refers to undertakings operating under Special Acts, which expression includes Provisional Orders; and to obtain authorization under it, electricity concerns have to apply to the Ministry of Transport.

In Battle Areas.—The representative of the "Journal" who accompanied the members of the allied gas-engineering party in a visit to the war-devastated areas of Northern France in the autumn of last year has received from Alderman Fred. J. West a copy of an album of photographs which recall some of the scenes visited. The photographs are excellent ones, and were taken by Mr. West and other members of the Engineering Commission who visited Germany in May of last year. The views include scenes in Arras, Lens, Vimy Ridge, and other parts; and friends who have been and seen and who have had a copy of the album will prize this excellent memento of their visit.

Advantages of the Gas-Furnace.—A large number of members of the Sheffield Gas Consumers' Association gathered to hear a a lecture on "Modern Gas-Furnaces," given by Dr. W. Rosenhain, F.R.S., of the National Physical Laboratory. The lecturer pointed out that gas is relatively an expensive fuel, and could only be advantageously used in very highly efficient furnaces, or where particular conditions of heating are required, calling for ease of control, great cleanliness, and specially high temperatures. The great rival to coal-gas firing is oil-fuel. The electrical method of heating would become of importance if electricity was cheapened further. At present, for most purposes, the cost of electrical heating is relatively considerably higher than that of gas. Coal gas possesses certain definite advantages, as a result of which it has made its way; and if the fullest possible use is made of these advantages, he thought its future would show still further important developments. The ordinary gas-furnace, depending on the mixing of gas and air before combustion, is necessarily inefficient in many ways; and furnaces which rely upon the efficient pre-heating of the air are very much better. He went on to describe a special recuperative furnace developed at the National Physical Laboratory, in which the air is strongly pre-heated.

EASTERN COUNTIES GAS MANAGERS' ASSOCIATION.

GENERAL BUSINESS AT THE HALF-YEARLY MEETING.

The Half-Yearly Meeting of the Association was held last Thursday, at the Liverpool Street Hotel, E.C. The attendance of members was good. At the commencement of the proceedings, the retiring PRESIDENT (Mr. W. W. Townsend, of Colchester) occupied the chair; the new PRESIDENT (Mr. A. W. Sumner, of Grays) entering upon his presidential functions later in the proceedings.

The minutes of the last meeting were confirmed; and the retiring Hon. Secretary and Treasurer (Mr. F. M. Paternoster, of Felixstowe) referred to the correspondence that had been received from members unable to be present.

ELECTION OF NEW MEMBERS.

On the motion of Mr. J. W. AUCHTERLONIE (Cambridge), seconded by Mr. H. G. RUGGLES (Leighton Buzzard) the following names were added to the list of members: Mr. W. H. Warren, of Beckton; Mr. R. J. Calderwood, of Spalding; Mr. Ernest Heath, of Haverhill; Mr. Percy J. Kendall, of Halesworth; Mr. Ernest Shadbolt, of Grantham; Mr. Harold R. Thomas, of Cambridge; and Mr. J. Bales Hansford, of Bedford.

RETIREMENT OF, AND PRESENTATION TO, MR. PATERNOSTER.

The PRESIDENT said he had a very pleasurable duty to perform. Most of the members were aware that their Hon. Secretary and Treasurer (Mr. Paternoster) was retiring at this meeting; and, as was usual, the members desired to make some tangible recognition of their appreciation of his services by making him a presentation. As he had said, this was the usual thing to do when an Hon. Secretary retired, because it was felt that, in an Association such as this, a great deal depended upon the Hon. Secretary; and success was more due to him than to anyone else. In this case, there were special reasons why they should acknowledge his services. As the members were aware, Mr. Paternoster was unable to be present at the last meeting, as he was seriously ill. They were pleased to see him restored to health, and able to take part again in the proceedings. [Hear, hear.] The illness culminated last year, but it had been going on for some time previously. Mr. Paternoster had not had good health for a long time. It was, in view of this, wonderful testimony to his grit that he stuck to the work of the Association so well as he did, when most men would have given up altogether. He would not leave the Association until someone else was firmly seated in the saddle, and for this they owed him a great debt of gratitude. Gas management during the war was not a bed of roses. In a town like Felixstowe it was anything but a bed of roses. As they knew, the town had a great many serious air-raids; and their friend had a good deal of anxiety, and a great deal of difficulty in carrying on work and business. But he never allowed anything—his work or indifferent health—to interfere with the discharge of his duties to the Association. Without further words he asked Mr. Paternoster to accept the gifts which had been subscribed for by the members, coupled with their best wishes for his complete restoration to health, and a prosperous career in the profession.

The presentation consisted of a canteen of cutlery, supplied by Messrs. Mappin & Webb, consisting of stainless cutlery and princes plate. The case is of oak, with the following inscription on a tablet:

Presented to F. M. PATERNOSTER
by the Members of the
EASTERN COUNTIES GAS MANAGERS' ASSOCIATION,
in recognition of his Services as Honorary Secretary,
1915 to 1920.

The gifts included for Mrs. Paternoster a gold wrist watch, with expanding link chain.

Mr. PATERNOSTER, in acknowledgment, said he hardly knew what to say to thank the members for the generosity they had shown him in making this presentation. He could hardly say that surprise had rendered him tongue-tied, because a few weeks ago he had an intimation that a presentation was to be made; and he was asked to select the articles. He was never good at expressing his feelings in public; and he could do little more than thank the members for their kindness and generosity. One of the gifts was to be handed to Mrs. Paternoster; and she would value them both (as he himself did) as a token of the members' appreciation of the work he had done during the past five years for the Association. He felt, however, he had not served his full term of office. He believed it had been usual for the Hon. Secretary to serve at least seven years. He was the first one to only serve five years. But the five years had been during the period of the war; and he thought they had all during that time done more than five years' work, and stood more than five years' strain. It had left its mark upon them. He should like to acknowledge the kind assistance he had had from every occupant of the presidential chair during his term of office, and from every member of the Committee; and he knew that this support and assistance would be extended to his successor, Mr. Mainwaring. The work had been a labour of love to him (Mr. Paternoster); and he felt he had made during it many lifelong friends. He should regret the day if ever he had to sever his connection with the Association. Once more he thanked them.

Mr. W. H. Mainwaring, of Lincoln, then entered upon his duties as Hon. Secretary and Treasurer.

Mr. F. PRENTICE (Ipswich), later in the proceedings, when speaking on the subject of high and low pressure systems, remarked that Mr. Paternoster started his gas career in the Ipswich Gas-Works. From there he went to Felixstowe, where he occupied a very distinguished place, and took a useful part. In view of this fact, he (Mr. Prentice) wished to offer Mr. Paternoster his congratulations on the presentation made to him that day, and say he hoped he would be spared for many years to enjoy better health than he had done lately, and generally to see life in its most pleasant aspects.

INDUCTION OF NEW PRESIDENT.

The PRESIDENT said the next item on the agenda was the induction of the President for 1920-21—Mr. A. W. Sumner, of Grays. He (Mr. Townsend) had the greatest pleasure in inducting him to the chair. The members had a taste of his quality in the paper that he read at Colchester in the early part of the year; and they would have then noted that he possessed the qualifications required by the gentleman who occupied the chair of the Association. They showed that they felt this by unanimously electing him to the presidency. In the work Mr. Sumner had done at Grays, he had shown a great deal of courage, ingenuity, and resource, and he felt sure that as President of the Association he would add to the reputation he already enjoyed. He had great pleasure in asking Mr. Sumner to take the chair.

The members welcomed Mr. Sumner to the chair with cheers.

The PRESIDENT said he should like to thank the members for the honour they had done him. Whatever his friends might say, he personally did not feel at all capable of occupying the post; but seeing that it had fallen to his lot, he would do his best to give satisfaction. He should like to thank Mr. Townsend for the good things he had said regarding him. He had not at all deserved them; but if he could in some slight measure make up for his deficiencies during his year of office, he would be very pleased.

THANKS AND A MEDAL.

The PRESIDENT said his first duty was to propose a hearty vote of thanks to the retiring President, and to hand to him the President's medal. It did not need any works from him to say that the members had enjoyed very much the work Mr. Townsend had done for the Association during his year of office. They knew him as a capable engineer. They had an opportunity last year of examining his work at Colchester; and he (the President) was sure it would be a long time before they forgot what was then seen. It was a pleasure to him (Mr. Sumner) to follow in the chair such an able gas engineer as Mr. Townsend; and he was glad he would have his assistance during his year of office. He had now, in the name of the Association, to hand to Mr. Townsend the President's medal; and, in doing so, he expressed the hope that the medal would always remind Mr. Townsend of the pleasant time he had spent as their President.

The proposed vote of thanks needed no seconder, for it was at once carried with acclamation.

Mr. TOWNSEND thanked the President most heartily for the kind words he had said in recognition of what he (the speaker) had done, or had tried to do, during his year of office, and the members for the manner in which they had received the proposal. He had had a very enjoyable year of office; and he was glad to think the meeting at Colchester a success—at any rate, everyone seemed to think it was. If anything he had been able to do had any measure of value for the Association (in which he had always taken a deep interest), he should be pleased. He was glad indeed to be a wearer of one of the President's medals, and to join the happy band of Past-Presidents. He also wished to thank the members for the way in which they had responded to all the requirements he had made upon them during his year of office.

DISTRIBUTION PROBLEMS OF TO-DAY.

There was a long discussion on this subject. Various aspects of distribution questions were introduced separately by Mr. J. W. Auchterlonie, Mr. J. H. Troughton, Mr. T. Glover, Mr. F. Prentice, Mr. J. Terrace, and Mr. E. F. Keable; and these were discussed at some length. The report commences on p. 87.

ELECTION OF REPRESENTATIVE ON THE INSTITUTION COUNCIL.

On the proposition of Mr. H. R. WIMHURST, seconded by Mr. TERRACE, it was unanimously agreed that Mr. Sumner should be the representative of the Association on the Council of the Institution of Gas Engineers.

PLACE OF NEXT MEETING.

The PRESIDENT remarked that he hardly knew what to say about the next meeting. His Directors would be very glad to see them all at Grays during the spring of next year; and he hoped

to be able to make some arrangement. On the other hand, they could not offer them the attractions of some of the larger towns. If the members would leave the matter in the hands of the Council and himself, they would endeavour to get up a good meeting, and also, if they could, fit in a visit to Grays, so that the members might see the works there.

VOTES OF THANKS.

Mr. MALLETT proposed a hearty vote of thanks to the retiring President (Mr. Townsend), and the officers and Committee of the Association for their excellent services during the past year.

Mr. AUCHTERLONIE seconded the vote, which was heartily accorded.

Mr. TOWNSEND, in reply, said he hoped they had found the meeting that day a success, and that it had really elicited some useful information. For this they had to thank in the first place Mr. Paternoster, their retiring Secretary, whose idea it was, and secondly the gentlemen who had come forward and opened the discussions on the various topics. He proposed a vote of thanks to those who had introduced the different discussions.

Mr. WIMHURST seconded, with the remark that the subjects had all proved of exceptional value, and would, he believed, be of great service to the industry. The programme had aroused much interest among other Associations; and the Secretary had received inquiries as to the procedure adopted.

The PRESIDENT added his thanks to those who had come forward.

Mr. AUCHTERLONIE, who acknowledged the vote, agreed that it was a very good idea to have these informal discussions.

Before separating, the members took tea together.

COAL MINES IN 1919.

Points from the Inspectors' Reports.

PART I. of the Home Office Report on Mines and Quarries for the year 1919 is a Blue-Book of nearly 200 pages, which contains the divisional statistics for the year, and reports of the Divisional Inspectors. Mr. W. Walker (as Chief Inspector of Mines) is in the gratifying position of being able to announce a record in the matter of the death-rate from accidents in and about mines under the Coal Mines Act in that year; the figure being only 0·94 per 1000 persons employed. In the 2943 mines at work under the Act, the total number of persons employed under and above ground was 1,191,313, as against 1,008,867 in the preceding year.

The total output of coal in 1919 is given as 229,779,517 tons, which compares with a total of 227,748,654 tons in 1918, and shows an increase of 2,030,863 tons. The output was distributed over the various coalfields controlled by the Divisional Inspectors as follows: Scotland, 32,457,864 tons, an increase of 567,646 tons. Northern Division, 43,834,410 tons, an increase of 3,640,049 tons. York and North Midland Division, 57,946,477 tons, a decrease of 3,327,269 tons. Lancashire, North Wales, and Ireland, 22,739,929 tons, a decrease of about 25,000 tons. South Wales, 47,522,306 tons, an increase of 805,771 tons. The quantity of anthracite raised during the twelve months was 3,935,681 tons, Midland and Southern Division, 25,242,216 tons, an increase of 367,383 tons. From Scotland, there is reported an increase in the use of coal-cutting machines; the total quantity so treated last year being 10,379 495 tons.

The Inspector for the Northern Division says that at one colliery, taking both surface and underground, the increase in the number of persons employed has been from 2505 in 1914 to 3014 in 1919; and with all this, the output of coal is less by 800 tons per day. Here, again, coal-cutting machines are making much progress; 10 p.ct. of the coal having been so wrought last year. On the subject of hydraulic packing, Mr. Wilson says: "Attention of late has been largely attracted to the loss of coal permanently left in barriers which might have been saved under some other form of ownership. For purely mining reasons, these barriers in some situations are quite necessary; and I believe in the Northern Division the saving would not be as great as anticipated. There is another direction, however, in which much valuable coal might be obtained. In many of the cases in this division where mining is carried out in populous districts, only some 40 p.ct. of the coal can be worked. The remainder has to be left to support the property upon the surface. The introduction of the hydraulic system of stowing would result in total extraction of the coal without any appreciable damage to the surface, and thus very considerably increase the productiveness of the collieries concerned. As an instance of what some of our allies are doing in this respect, Japanese mining engineers inform me that they have introduced hydraulic packing with sand into the mines with the sole object of lowering the flat surface of the rice fields uniformly."

In the York and North Midland Division, the proportion of coal produced by coal-cutting machines was 12 p.ct. of the whole output. The division still maintains premier position in the United Kingdom, both as regards persons employed and quantity of mineral produced; and there is every prospect of further improvement from the mining developments going on. Full particulars and plans are given relative to an explosion by which six men were killed in the Oxcroft Colliery, Derbyshire. Electricity was used underground for lighting, pumping, and coal-cutting; and the finding of the Coroner's Jury was that the explosion was caused by an electric spark igniting accumulated gas.

As to Lancashire and North Wales, Mr. Nicholson remarks that the reduced output is very far short of industrial and domestic requirements. The reduction in hours from eight to seven for colliers has, with very few exceptions, resulted in a reduction of from 8 to 12 p.ct. in output. Wages continue to rise; and in spite of an increase in the number of persons employed, there is no improvement in output. The output per person employed for the division was 221 tons per person underground, and 175 tons per person above and below ground, as compared with 257 and 201 tons in the preceding year.

In South Wales, except in a few cases, no development of the coalfield by large companies is proceeding, owing to the uncertainty of the future control of the industry.

The small increase in the output of the Midland and Southern Division is said to be very much out of proportion to the large increase in the number of persons employed. In addition to the reduction in hours, a good many men did not return from the army until well on in the year. By coal-cutting machines, 2,243,389 tons of coal were obtained.

THE "B.A." FUEL ECONOMY COMMITTEE AND THE BRITISH ASSOCIATION.

THE "Chemical Trade Journal" has devoted another article to the question of the relations of the Fuel Economy Committee of the British Association and the Fuel Research Board—taking the comments in our issue of Sept. 22 on its own article as the basis for this fresh one, which does not do anything to advance or elucidate a matter which seems to perplex our contemporary.

We notice it cannot discern any difference between comments upon its own article and a defence of the Board of Fuel Research; but, of course, we are not responsible for that. If our contemporary will look into the question historically, perhaps it will come to the conclusion that there were other reasons than the energetic propaganda work which the Fuel Economy Committee carried on (and for which we give Prof. Bone all praise) which caused the Board of Fuel Research to come into existence. Its institution was part of the programme of the Department of Scientific and Industrial Research. The "Chemical Trade Journal" proceeds to suggest that it was the natural inference that the information which had been collected by the Committee and its general work would be taken over by the Fuel Research Board; but it adds that "apparently this was not so, as admitted by our contemporary." We made no such admission. Our words were: "We have not heard that this work has been relinquished by the Board, although the British Association resuscitated the Committee whose work was apparently transferred." Our contemporary refers to the Fuel Economy Committee being engaged in researches on the chemistry of coal at the fuel laboratories of the Imperial College of Science and Technology; and it remarks that "it is hardly necessary to say that this duplication of work—for we presume that the Fuel Research Board itself is working in the same direction—is undesirable, especially when the two parties are working independently of each other, and on terms almost of hostility." Now we have not heard of anything at all approaching "hostility" to the Committee from the side of the Board of Fuel Research; and we do not see anything "undesirable" in different workers bringing their brains to bear independently on the same problems. If, however, it is undesirable, our contemporary must have overlooked the fact that it was not the Board of Fuel Research that resuscitated the Fuel Economy Committee, and it was on the initiative of the Committee itself that the researches were revived. Perhaps our contemporary will make inquiries of Prof. Bone (as Chairman of the Committee) as to why the Committee and the work were revived, if, in its opinion, duplication of research in this direction is undesirable. Moreover, a second Fuel Economy Committee now exists in connection with the Federation of British Industries. What follows in the article of the "Chemical Trade Journal" is proof conclusive that it writes on this particular subject without any very intimate knowledge. But over its final sentences we can heartily shake hands. Says our contemporary: "Our object was not in any way to support Prof. Bone or his strictures upon the gas industry. That would be far beyond our province; and, moreover, there are no stronger supporters than ourselves of allowing industry generally, including the gas industry, to get on with its new work free from the unnecessary hindrances which are too painfully evident in many directions."

From the Secretary of the British Engineers' Association, No. 32, Victoria Street, S.W., there has been received a copy of the "Pathology of Industrial Unrest," with some special reference to the engineering industry, by Mr. D. A. Bremner, O.B.E., the price of which is 3d. net. The author diagnoses the disease as "a morbid state of a feeling—an emotion—an affection of the mind—complicated by ignorance." This being so, he suggests remedies which are claimed to be intensely practical, even to the extent of being the only possible means of restoring the industrial world to a normal state of health. For these, the better organization of employers is essential.

NORTH OF ENGLAND GAS MANAGERS' ASSOCIATION.

Autumn Meeting at West Hartlepool.

The Half-Yearly Meeting of the North of England Gas Managers' Association was held last Friday, in the offices of the Hartlepool Gas and Water Company—Mr. Arnold W. Branson, the Engineer, Manager, and Secretary of the Company, and President of the Association, being in the chair. There was a large attendance.

Apologies for Absence.

The Hon. Secretary and Treasurer (Mr. Herbert Lees) read letters of apology for absence from Mr. T. Goulden, the President of the Institution of Gas Engineers; Mr. W. Doig Gibb; Mr. C. H. Armstrong, of Wallsend; Mr. W. W. Townsend, of Colchester; Mr. C. F. Botley, of Hastings; Mr. W. H. Bennett, of Redhill; Mr. W. H. Mainwaring, of Lincoln; Mr. G. S. Frith, of Runcorn; Mr. Octavius Thomas, of Rhondda; Mr. W. G. S. Cranmer, of Willenhall; Mr. A. B. Walker, of Wallsend; and Mr. Harold E. Bloor, of York.

New Members and Associate Members.

The following gentlemen were elected: As members, Mr. William Tunmore, of Annfield Plain, and Mr. Geoffrey Weyman, of Gateshead; as associate members, Mr. John M'Gilligan, of West Hartlepool, and Mr. Charles Stanley Read, of Newcastle.

The Late Mr. Thomas Waddom.

The President said before they proceeded to the rest of the business, they had, unfortunately, one sad duty to perform, and that was in reference to the late Mr. Thomas Waddom, of Newcastle. He desired to move the following resolution:

> "That this meeting records with deep regret the death of Mr. Thomas Waddom, who was a Past-President of the Association and Chairman of the Special Purposes Section since its formation, and hereby expresses its appreciation of the valuable services he has rendered to the Association and to the gas industry in the North of England."

The resolution was carried; the members standing in token of respect.

The President delivered the following

INAUGURAL ADDRESS.

Gentlemen,—I thank you very heartily for the honour you did me at your last meeting in electing me President for the ensuing year, and am sorry that circumstances prevented my being present that day.

It is thirty-two years since the Association last visited West Hartlepool, on which occasion my predecessor (the late Mr. Thomas Bower) presided; and if I could hope to fill the position as worthily as he did, I should be well-satisfied at the end of my year of office.

It is interesting to note that at that time the undertakings in charge of the members of the North of England Gas Managers' Association represented a capital of nearly 5 millions sterling, making 7200 million cubic feet of gas per annum, and using over 710,000 tons of coal; whereas to-day the capital employed by the undertakings represented amounts to 8 millions sterling, the gas made to over 15,000 million cubic feet per annum, and the coal carbonized to about 1¼ million tons.

At that time a good deal was being said as to electric light competition, and the reduction in gas consumption which might be anticipated as a result. Time has proved any such prophecy to be false. The introduction of the electric light, and the incandescent gas mantle in 1895, created a desire in the public for more and more illumination, while the gas industry itself was stimulated to provide further facilities for the use of gas, and to expend considerably more thought and effort in educating the public as to its advantages for cooking and heating purposes, until to-day the claims of gas for domestic and industrial purposes are so indisputable as to warrant the conviction that its use will continue to increase very largely.

While it is agreeable and interesting to look back on the successful development of the industry in bygone days, we have to remember that we are living in very different times to-day. Five years of warfare such as was never known before have brought us into a new industrial world, where we are faced on every hand with changed conditions and unrest; so that the transition from war to peace is proving well-nigh as difficult and trying as the war period itself.

Labour.

The problem of how it is possible for employer and employee to work together in the true sense is still unsolved. While trades unions and collective bargaining are fully recognized by the gas industry, and the employers are, through their Federation, in a position to act and ensure that the agreements come to are fully carried-out by those they represent, unfortunately the same cannot be said on the men's side; so that there is no finality about negotiations.

I am glad to say there is no complaint on that score with regard to this district; but it is a farce to speak of "national agreements," when any district whose representatives are parties to an agreement refuse to stand by them, and come out on strike, as has been the case lately. The inference is that the Executive is not really empowered to act for the men; and unless there is a change in this respect, we shall find gas undertakings leaving the Federation and refusing to be parties to national agreements.

We live in a succession of labour crises; but the threatened strike of miners is perhaps the most serious yet experienced. Having at last consented to negotiate in a rational sort of way as to their claims, it is to be hoped a settlement will be finally arrived at which will possess the refreshing novelty of definitely coupling wages with output.

The threatened stoppage of coal supplies once more emphasizes the vital need for ample coal and oil storage; and it also brings home to the gas consumer the value and convenience of gas as a fuel, and as a means of conserving coal in such an emergency. The result is a big influx of orders for cookers and fires. This is all to the good, as, once installed and their usefulness proved, there is every likelihood of their becoming permanent sources of revenue.

Labour-Saving Machinery.

War conditions have been responsible in a number of works for the introduction of labour-saving machinery at an earlier date, probably, than would otherwise have been the case. Here at West Hartlepool, on the outbreak of the war, the carbonizing plant in the No. 2 retort-house consisted of seventeen regenerative settings of seven oval-section retorts, 21 in. by 15½ in. by 18 ft. 6 in. long, and these retorts were charged by hand with 4½ to 5 cwt. of coal per through-retort in six hours, and required the services of 52 men when in full operation, apart from coal trimmers and foremen.

It soon became very necessary, in view of the scarcity and increasing cost of labour, to consider some scheme which would enable the work to be done by a less number of men; and in 1916 machinery was installed, consisting of coal-handling plant in duplicate, breakers, elevators, conveyors, continuous coal storage hoppers, and one of Messrs. Drake's combined machines for charging and discharging, together with a telpher machine and track to remove the coke from the retort-house and stack it in the yard or load it into trucks over screens. The retort-house lent itself very well to this arrangement; and a considerable saving in labour (averaging throughout the year over 40 p.ct.) was effected.

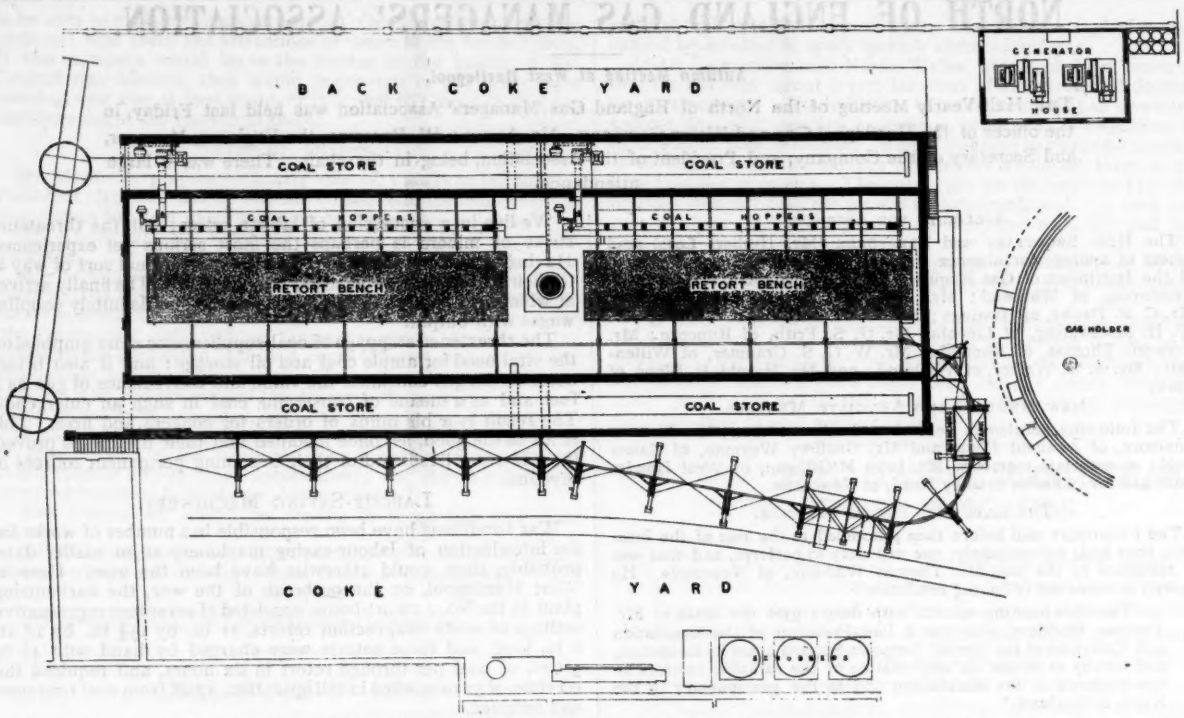
The combined machine has worked excellently; the only stoppages being due to pieces of wood or iron occasionally passing through the breakers with the coal, and causing the rotor to jam by becoming wedged in between the edges of the vanes and the outer casing. An improvement has been effected in this respect by giving the vanes more clearance. The retorts are filled; but, unfortunately, owing to the small section and the short length (18 ft. 6 in.), they will not hold more than 10 cwt. of coal.

Remodelling the Old Works.

We are now engaged remodelling the retort-benches, and substituting segment arches for the existing semi-arches, with eight 21 in. by 15 in. straight-sided ⌂ section retorts in each bed, in place of the seven ovals. This will increase the carbonizing capacity of the beds by 2 tons per bed per day. At the same time the furnaces upon the machine side are being dispensed with, and step-grate furnaces built on the discharging side. This will, it is anticipated, reduce both the fuel and labour costs per ton of coal, and do away with the wheeling round of cold coke from the discharging side.

The problem in these times—as to how far it is wise, in order to meet increasing consumption, to go on remodelling and extending the carbonizing plant on an old congested site, where other portions of the plant (such as scrubbers, condenser, boilers, engines, and purifiers) are becoming overtaxed—is more difficult to solve than ever, owing to the enormously increased capital cost of erecting complete new works. The works on which we are assembled to-day is a case in point, hemmed-in by railways on three sides, and a public road on the other. Although the carbonizing capacity of the works (and to a certain extent the capacity of the remainder of the plant) can be very considerably increased on modern lines without much difficulty, the space available for coal and coke storage is so limited that it is a very difficult question to decide what is the best course to take to meet the increased demand for gas—whether to remodel the existing works throughout, and suffer the disadvantages of small coal and coke storage, or face the outlay involved in erecting a complete installation of coal-gas plant on our other works' site, where at present we have carburetted water-gas plant and sulphate works only.

Where an undertaking is not in a position to command the best prices for residuals, a complete gasification process may make it possible to continue on an existing works' site for a number of years, and produce on a small area a comparatively large output of gas at a low capital cost per therm. But I hardly think this will be the solution along the North-East coast where, taking the average of years, the secondary products return in revenue a high percentage of the costs of manufacture. And even in any dis-



COAL, COKE, AND GENERATOR PLANT AT HARTLEPOOL.

trict it would seem a doubtful policy to limit business to the sale of gas only (unless it be coke-oven gas at a sufficiently low fixed price), until there are clearer indications as to the future values of residual products.

Still, until it can be shown that the cost of gas into the holder can be reduced to an extent not possible on the existing site, and to an extent which will, in the near future, justify the capital outlay on complete new works, every possible means of increasing the capacity of the existing works needs to be carefully considered. In this connection (in addition to complete gasification types of installation) there is offered to-day a choice of plant occupying a small amount of space compared with capacity—a feature which, I think, it will pay makers and designers of plant to consider more particularly.

Secondary Products.

The question of the market for residuals has special interest at present, owing to the phenomenal prices realized for coke for export, which has so materially helped to keep-down the price of gas in the case of undertakings able to take advantage of it. Unless there is a big improvement in the output of coal, and an increase in the proportion available for shipment, one would expect coke to continue to realize enhanced values for some considerable time yet, both for land sales and export. An increasing use of coke-oven gas, a more general adoption of the process of steaming, the installing of water-gas plants and Tully plants, will all tend in the same direction, by reducing the coke available for sale.

Tar has, during the last twelve months, at last begun to realize prices more in keeping with the increased costs on the expenditure side of the accounts; and values to-day are some 300 p.ct. above those quoted a year ago. It is quite possible high-water mark has been reached; but there seems to be no reason to expect a decline in the near future, owing to (among other reasons) arrears of tar-spraying of roads, and the increased value of all descriptions of fuels, including creosote, which is being largely adopted for steam-raising on ships. Creosote is also being exported to America and other countries in tank-steamers for treating timber and for other purposes. There is also the new demand which has arisen since pre-war times—that is for tar products in the dye industry.

In the case of sulphate of ammonia, the net market value barely keeps pace with rising costs of labour and materials; and the future is not so promising as in the case of other secondary products. Germany is reported to be recovering rapidly as far as the production of synthetic ammonia is concerned; while increased competition is being experienced from America and Holland. Then, in this neighbourhood, we have a formidable competitor in prospect. As is pretty widely known, Messrs. Brunner, Mond, & Co. are about to erect huge works at Billingham for the production of synthetic ammonia by means of a modification of the Haber process; and it is difficult to predict what the effect will be. One thing no doubt should be done—that is, to consider carefully the repeated advice of the Sulphate of Ammonia Association to adopt some process for the production of a neutral sulphate, so as to be in a better position to meet competition.

Benzole Extraction.

The motor fraternity have been very insistent of late on the necessity of gas undertakings generally taking-up the practice of benzole extraction from gas, and have even endeavoured to secure the insertion of a clause in the Gas Regulation Bill in order to make scrubbing for benzole compulsory. As we all know, mechanical road traffic is increasing rapidly throughout the world; and the demand for motor fuel is growing correspondingly. This being so, the supply of petrol to this country is likely to diminish and increase further the price. Some substitute will have to be forthcoming to meet the deficiency; and, as far as our present knowledge goes, benzole and town gas are most likely to meet the demand. In such circumstances, benzole will command a price which will make it pay to extract it from the gas; and there will be no need to talk of compulsion. While I believe benzole extraction will become a general practice, the difficulty with flat-flame burners will have to be overcome, and consumers convinced that not only is it in the public interest to make better use of a valuable fuel like benzole, but that the gas can be supplied at a lower price by reason of its removal, and that it is distinctly to their advantage to substitute incandescent burners for flat-flames.

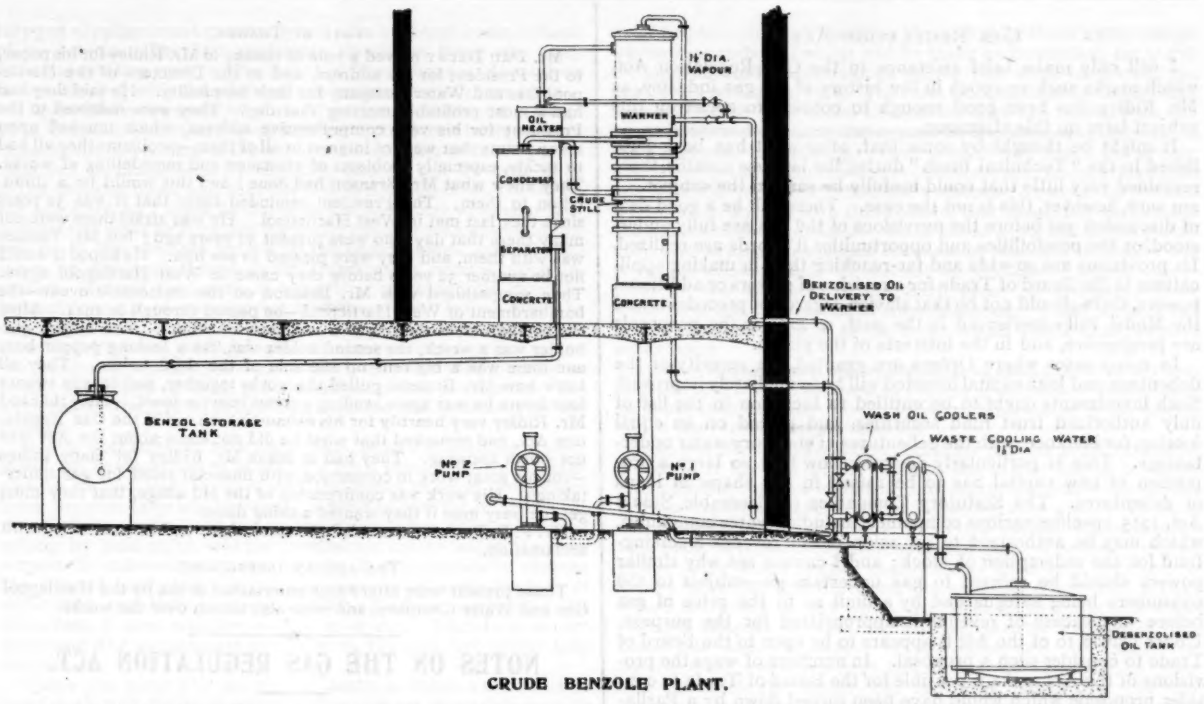
The flat-flame burner is still in much more common use than is generally recognized—at least, that is our experience in taking a census of consumers' fittings and appliances under the Sales Organization Scheme of the British Commercial Gas Association; and it is advisable to offer every possible inducement to these consumers to have the obsolete burners replaced by incandescents. With this object we have adopted a practice of providing and fixing a variety of incandescent burners at considerably less than cost price, if in replacement of flat-flame burners.

In 1917 the Company, in response to the appeal of the Government to adopt the process of extracting benzole from the gas by means of oil-washing, instead of scrubbing with tar, placed an order with the Power Gas Corporation, of Stockton-on-Tees, for a crude benzole recovery plant, capable of dealing with 10,000 gallons of creosote wash-oil per day. It is still in successful operation, and produces such a good quality of crude spirit that I think it is worth more particular reference.

Description of Apparatus.

Crude Still.—This consists of a cylindrical casting forming the oil chamber, on which are mounted a series of trays one above the other. These trays are provided with overflow connections (internally) on opposite sides, the ends of which are sealed in the oil. Five smaller vapour pipes are fixed in each tray, being covered with hoods having serrated edges. These cause the vapours of steam and benzole to bubble through the oil; the intimate contact liberating the benzole to a very efficient degree. Above the trays, which form the dephlegmating column, is the heat exchanger, which consists of a cylindrical vessel having steel tubes expanded into end-plates. The hot vapours from the crude still below are led to the top of the tubes; and the incoming cold oil enters at the bottom and flows round the tubes. The apparatus is designed to utilize the heat from the vapours of the crude still to raise the temperature of the cold benzolized oil before passing to the heater proper. The steel tubes referred to had to be renewed after being in use for eighteen months—due largely, I think, to a high percentage of water in the oil, as a result of leakage in the heater radiator pipes.

Heater.—This is a cast-iron vessel, the interior of which is fitted with four cast-iron gilled radiating steam-pipes. It is very effi-



CRUDE BENZOLE PLANT.

cient; and a high temperature can be raised if required, with the minimum amount of steam. The gilled pipes, however, do not last a reasonable length of time; and, after consideration, we have decided to try Meldrum metal in place of cast iron, and to have the gills cast vertically, instead of horizontally.

Condenser and Separator.—This consists of a steel vessel divided into two parts—the top having a steel coil for cooling, the lower part (being the separator) having "run-offs" for benzole and water, of the usual visible type.

Coolers.—These are of the multitubular type, each in four sections. The oil is circulated round the tubes and the cooling water passes through in the opposite direction. The counter-current principle is followed throughout the cooling system. Two of these coolers were originally installed; but it was later found necessary to add another, in order that the temperature of the debenzolized oil returning to the rotary washer might be kept slightly below the temperature of the gas.

Boiler.—This is a vertical type Cochrane boiler, and is situated in close proximity to the plant so as to ensure good dry steam.

Removal of Naphthalene.

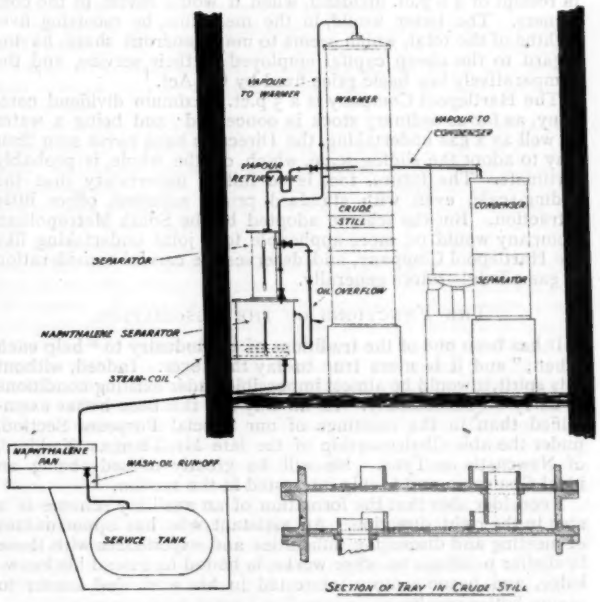
In conjunction with the above plant, we have also added a small naphthalene extraction plant, consisting of a separator and "baby" still. This apparatus is fed from the top tray of the dephlegmating column of the crude still, by a pipe having a 22-in. seal, which conveys the condensate from the crude still to the separator—the latter resembling the separator of the crude still on a small scale. The oil overflows by an 18-in. seal to the still which is below the separator; and here it is heated by means of a dry-steam coil—the lighter vapours being vaporized and conducted to meet the vapours of the crude still proper. The heavier oil remains in the still; and when the latter is full it is emptied into the cooling pan where the naphthalene salts cool-out. The oil is then drained off, and put into circulation again; and the recovered naphthalene is taken to the store.

As a general rule, there is about 15 p.ct. of naphthalene in the wash-oil when received; but this is reduced by means of the extractor to under 2 p.ct., which assists in keeping-down the naphthalene content of the gas at the outlet of the rotary washer-scrubber, used for oil-washing. Thus, instead of benzole recovery from the gas being accountable for a large increase of naphthalene complaints in the district (as I believe has been the case in many places), I can safely say our experience has been the reverse, and an improvement effected in this respect.

I give below the average figures for tests during twelve months ended Dec. 31, 1919.

—	Inlet of Scrubber. Naphthalene Grains per 100 C.Ft.	Outlet of Scrubber. Naphthalene Grains per 100 C.Ft.
January	7·25	1·95
February	5·13	2·23
March	6·70	2·55
April	7·30	2·05
May	7·90	1·77
June	8·40	0·86
July	9·60	2·60
August	No tests	No tests
September	No tests	No tests
October	8·60	0·74
November	8·75	1·54
December	9·35	2·02

To operate the plant, creosote oil of suitable quality is circulated through the rotary washer-scrubber, and then flows by gravity to the benzolized oil tank. From here it is pumped to an overhead feed-tank which ensures a constant feed to the still. To the bottom of the crude still, steam at about 100 lbs. pressure is deliveerd, while the oil, preheated to 105° to 110° C. by the hot vapours from the still and also by the heater proper, passes over a series of trays in the dephlegmating sections of the still. The action of the steam bubbling through the wash-oil liberates the crude benzole, which, together with the steam, is condensed. The condensed water and benzole are separated, the water running to the drain and the benzole to the storage tank. The hot debenzolized oil leaves the still through a seal, and then passes through the three water-tube coolers in order to bring it down to a temperature suitable for washing the gas (15° to 20° C.).



Naphthalene Separating Arrangement.

The quality of the crude benzole obtained is, as I have already intimated, very good; the highest test being 90 p.ct. at 120° C. This was confirmed by Prof. Bedsen, of Newcastle. With normal working, the quality is seldom below 82 to 83 p.ct. at 120° C., and is due to the naphthalene extractor working in conjunction with the crude still. When the extractor is not in operation, the quality of the benzole produced falls to 69 or 70 p.ct. at 120° C., and the oil becomes thick and unfit for use considerably sooner. The total amount of benzole recovered since the plant started amounts to over 150,000 gallons, or about 1·67 gallons per ton of coal carbonized, making no allowances for when the plant was laid-down for cleaning and repairs.

Gas Regulation Act.

I will only make brief reference to the Gas Regulation Act, which marks such an epoch in the history of the gas industry, as Mr. Ridley has been good enough to consent to speak on this subject later on this afternoon.

It might be thought by some that, after what has been published in the "Technical Press" during the last few months, there remained very little that could usefully be said on the subject. I am sure, however, this is not the case. There will be a good deal of discussion yet before the provisions of the Act are fully understood, or the possibilities and opportunities it affords are realized. Its provisions are so wide and far-reaching that, in making applications to the Board of Trade for a revision of powers or additional powers, there should not be that slavish regard for precedents and the Model Bill experienced in the past, so long as the proposals are progressive, and in the interests of the public.

In many cases where Orders are granted, the security of the debenture and loan capital invested will be immediately improved. Such investments ought to be entitled to inclusion in the list of duly authorized trust fund securities, and placed on an equal footing, for instance, with the debentures of statutory water undertakings. This is particularly desirable now that so large a proportion of new capital has to be raised in the shape of loans or debentures. The Statutory Companies (Redeemable Stock) Act, 1915, specifies various companies, including water companies, which may be authorized to set aside out of revenue a sinking-fund for the redemption of stock; and I cannot see why similar powers should be refused to gas undertakings—subject to the consumers being safeguarded by a limit as to the price of gas before any excess of revenue is appropriated for the purpose. Under clause 10 of the Act it appears to be open to the Board of Trade to consider such a proposal. In numbers of ways the provisions of the Act make it possible for the Board of Trade to consider proposals which would have been turned-down by a Parliamentary Committee as without precedent; and this is one of the best features of the new legislation.

While on this question of gas legislation, I should like to refer to the provisions of the South Metropolitan Gas Company's new Act which refer to the division of surplus profits between the consumers, proprietors, and employees. This is a particularly interesting scheme, which will I believe commend itself to many undertakings, except probably as to the proportions in which the surplus profit is to be divided. There, I think, they have hardly done justice to the proprietors of the old 5 p.ct. ordinary stock. When the Committee declined to grant the Company power to pay 6 p.ct. on the old stock, they should, in my opinion, when dealing with the scheme for the division of the surplus profit (taking 11d. per therm as the basic price) have treated the holders of the old 5 p.ct. stock more equitably, by allotting to them an additional one-eighth of the surplus until such time as they were in receipt of a 6 p.ct. dividend, when it would revert to the consumers. The latter would, in the meantime, be receiving five-eighths of the total, which seems to me a generous share, having regard to the cheap capital employed in their service, and the comparatively low basic price fixed by the Act.

The Hartlepool Company is a 5 p.ct. maximum dividend company, as far as ordinary stock is concerned; and being a water as well as a gas undertaking, the Directors have never seen their way to adopt the sliding-scale, which, on the whole, is probably fortunate. The future, too, is so full of uncertainty that the sliding-scale, even with standard prices adjusted, offers little attraction. But the scheme adopted by the South Metropolitan Company would be more applicable to a joint undertaking like the Hartlepool Company, and deserves the careful consideration of gas administrators generally.

The Functions of the Association.

"It has been one of the traditions of the industry to "help each other;" and it is more true to-day than ever. Indeed, without this spirit, it would be almost impossible under existing conditions to carry on successfully. In no way has this been better exemplified than in the meetings of our Special Purposes Section, under the able Chairmanship of the late Mr. Thomas Waddom, of Newcastle-on-Tyne. He will be greatly missed—being an ideal Chairman and keenly interested in the section.

I consider also that the formation of an auxiliary scheme is a step in the right direction. An assistant who has opportunities of meeting and discussing difficulties and experiences with those in similar positions on other works, is bound to extend his knowledge, and become more interested in his work and keener to secure better results.

There are a multitude of topics which suggest themselves for consideration on an occasion like this; but I feel I have already trespassed sufficiently on your time and patience. I should, however, like to refer in an appreciative way to the splendid services rendered by the National Gas Council and kindred bodies, but must be content with saying that the reproach which was at one time made—that the industry lacked proper organization—is no longer true.

Notes on the Gas Regulation Act.

Mr. T. P. Ridley read a paper dealing with the Gas Regulation Act. The text of this, together with a report of the discussion to which it gave rise, will be found on this page.

Vote of Thanks.

Mr. Dru Drury moved a vote of thanks to Mr. Ridley for his paper, to the President for his address, and to the Directors of the Hartlepool Gas and Water Company for their hospitality. He said they had had a most profitable meeting that day. They were indebted to the President for his very comprehensive address, which touched upon many points that were of interest to all of them—problems they all had to tackle, especially problems of extension and remodelling of works. They knew what Mr. Branson had done; and this would be a stimulation to them. The President reminded them that it was 32 years since they last met in West Hartlepool. He was afraid there were not many there that day who were present 32 years ago; but Mr. Terrace was with them, and they were pleased to see him. He hoped it would not be another 32 years before they came to West Hartlepool again. They sympathized with Mr. Branson on the memorable event—the bombardment of West Hartlepool—he passed through in 1914. After the bombardment there was a sad state of affairs. The largest gas-holder was a wreck, the second holder was like a leaking pepper box, and there was a big rent up the side of the third holder. They all knew how Mr. Branson pulled the works together, and that in twenty four hours he was again sending gas out into the town. They thanked Mr. Ridley very heartily for his exhaustive *résumé* of the Gas Regulation Act, and remarked that what he did not know about the Act was not worth knowing. They had to thank Mr. Ridley for many things—for his great work in connection with financial relief for gas undertakings. His work was confirmation of the old adage, that they must get the busy man if they wanted a thing done.

Mr. F. P. Tarratt seconded the resolution; and it was carried with acclamation.

Tea and an Inspection.

Those present were afterwards entertained to tea by the Hartlepool Gas and Water Company, and were also shown over the works.

NOTES ON THE GAS REGULATION ACT.

[A Paper read before the North of England Gas Managers' Association.]

By T. P. Ridley, F.C.I.S., Secretary and Commercial Manager to the Newcastle-upon-Tyne and Gateshead Gas Company.

The 4th of August, 1914, is a date which will always be remembered as one of the most memorable in the history of the whole world; and the 4th of August, 1920—exactly six years later—is a date in the history of the gas industry which will always be recorded as one of the most important, for on that date the Gas Regulation Act—an Act to amend the law with respect to the supply of gas—received the Royal Assent.

Between the two dates the gas industry suffered most unjustifiably, and was treated worse than any other in the kingdom, notwithstanding the most patriotic and generous service rendered not only to England, but also to its Allies, by supplying munitions which could not otherwise be obtained. The Temporary Increase of Charges Act only prevented things being worse than they would have been without it. It did nothing to rehabilitate the industry. This, however, is now past history. It is to the present and the future we must address ourselves and direct our energies.

The Gas Regulation Act provides for changing the method of charging for gas from volume to heat units, and gives to the Board of Trade very extensive power—power to sweep away provisions requiring gas undertakings to supply gas of any particular illuminating or calorific value; to modify the provisions affecting the payment of dividends; to provide a uniformity of testing conditions for the country and, by way of Special Order, to provide means for existing statutory gas undertakers obtaining at much less cost many supplementary powers which have hitherto only been obtainable by a Special Act of Parliament or Provisional Order, and provides means whereby non-statutory companies may become statutory in a simple and cheap manner.

The Act in its entirety has not received the commendation of the whole industry. It must, however, be looked at as a whole; and we must remember that, to some extent, it was a matter of bargain and compromise in order to obtain financial relief—although the case of the industry was such that compromise on its part should not have been required. It was not arrived at without opposition, as representatives of the local authorities not owning gas undertakings, railway companies, and consumers made their representations to the Board of Trade. The Act, looked at as a whole, I consider in all the circumstances to be quite good. It provides for restoring the stability of the industry and for opening-up avenues for development by ingenuity and effort for economical and efficient working on the part of all connected with gas undertakings. It is good not only for the industry, but also for the consumer; and, this being so, it is good for the workers.

I presume that you have all examined the Act, so I will now consider as briefly as possible the main features. Without going over ground covered by other writers on the subject, the first and most important is that relating to

Price and Quality.

Any undertaking may between now and August, 1922, make application to the Board of Trade for an Order, and it may be taken that it is a *sine quâ non* of every application that the applicants are prepared to adopt the heat-unit basis of charging. If application is not made by that date, the Board may make an Order applying the new system to such undertakings as have not then applied; and, therefore, it is practically certain that all statu-

tory gas suppliers must eventually sell on a heat-unit basis, instead of by volume. The first applicants should be those who need financial revision most. The Board of Trade have a stupendous task in dealing with the whole of the undertakings in two years.

I know there are some who would prefer to continue to charge as at present, and others to charge on a heat-unit basis without showing the conversion of the volume to heat units on the accounts rendered to consumers. I consider that to sell by heat units is the sounder basis, and that the conversion should be shown on the accounts, as I think by doing so the consumer will eventually understand what he is paying for better than he does now, and this will be to the ultimate benefit of the undertakings, even though there be some small loss at first, and more clerical work involved. To sell heat units is something more definite than the present 1000 c.ft. of very varying qualities of gas. It may safely be taken that the gas undertakings will supply the heat units in the form that they can most cheaply manufacture and distribute; and the freedom given in regard to quality of gas will consequently be to the advantage of both gas undertaking and consumer. The anxieties of the gas engineer, however, are not lightened by the change.

It will undoubtedly take some time before consumers understand the new method of charging; but I think they will eventually do so, and look upon it with less doubt than at the present time, because they will be buying a definite number of heat units of a definite quality. If the undertakings, when they commence selling by heat units, will lay themselves out to assist the consumers in understanding the change, it will materially shorten the time of confusion. If changes were never made because of difficulties, very little progress would be made in anything. We must face it now, whether we like it or not. Therefore do not let us put any unnecessary obstacles in the way, but rather help matters on.

There are some who do not like matters which have hitherto been dealt with by Parliamentary Committees being relegated to the Board of Trade; but I think it is an advantage, inasmuch as more uniformity of decision will be the result. There will also be less giving way to opponents for the sake of obtaining what may be considered the main objects in promoters' Bills. It is also in accord with the trend of present parliamentary practice.

Much has been said as to there not being a minimum dividend prescribed; but I think that the revision clause comes very near to providing this.

Selling gas on a heat-unit basis makes the washing of gas for benzole less attractive. If debenzolizing means a reduction of 5 p.ct. in B.Th.U., and the price of gas be (say) 3s. 4d. per 1000 c.ft., the undertaking receives 2d. per 1000 c.ft. less. This must then be multiplied by the cubic feet sold per ton of coal carbonized—say 11,000 c.ft.—which represents $\frac{1}{7}$ to be set against the 1 or 1½ gallons of benzole produced per ton of coal—in addition, of course, to the costs of recovery and refining.

In making application, the undertakings must serve notice on the local authorities, and state the maximum or standard price per therm proposed. Therefore, each undertaking must make up its mind what it considers will be a fair new maximum or standard price which it can substantiate.

A copy of the documents submitted to the Board of Trade may be inspected at the undertaker's office, and the local authorities may obtain copies on paying the usual charges for copying.

Representations may be made to the Board of Trade by local authorities and by other consumers within a specified time, and the undertakers must furnish to the Board their observations on any representations made, and send a copy of them to the party making the representation; and where the Board think it expedient to do so, they will cause an inquiry to be held. Surely every protection is here afforded to local authorities and consumers. Fees, according to the quantity of gas supplied (but not exceeding £30), are payable by undertakers making application under the Act together with any extraordinary expenses incurred by the Board of Trade in connection with a local inquiry. See the Board of Trade Rules for further details.

The Board of Trade presumably leave it to the parties concerned to decide whether they will be represented by others than directors, members of gas committees, or officials of undertakings. I would here appeal to local authorities and railway companies to be more reasonable than they have been on many occasions when gas matters have been before Parliamentary Committees. In the past many of them appear to have looked upon a Parliamentary Bill as an opportunity for screwing the uttermost out of gas undertakings. In the new order of things, I hope they will look with greater sympathy upon gas undertakings, and remember that dividends are limited by Statute. Let there be reason on both sides. It is an opportunity for improving relationships with local authorities. It is probable the Board of Trade would welcome agreements arrived at between local authorities and gas supply undertakers so long as they come within the scope of the Act.

In obtaining Orders, the great difficulties and disputes will range round the fixing of the new standard and maximum prices. These notes are prepared before any Orders have been made, and before the schedule and model forms are obtainable, although certain information as to the schedule was published in the "Gas World" of the 2nd inst., and since supplemented by the "GAS JOURNAL" of the 6th inst.

I gather that the pre-war period is to be the three years that ended June 30, 1914, or the last three completed yearly periods prior to June, 1914. Therefore, the period for those undertakings whose year ends at Dec. 31 will be taken as December, 1913, and for local authority undertakings whose year ends in March, the period will be March, 1914. The form also provides for costs being supplied for the year ended December, 1919, and figures from the latest published accounts subsequent to that date—the last-named for a half year if available. Then provision is made for adjustments to meet alterations in wages and changes in prices of materials not reflected in the last published accounts. It is to be remembered, when dealing with this column, that there may be items in the latest published accounts which cover a portion of the period only, and adjustments should be made so that the increases will cover the whole period. It will not be possible to adjust everything to the accuracy of the third place of decimals; there must be a certain amount of approximation. I will make a few observations upon some of the items which will, I think, require adjustment.

Coals.—Adjustments will be required to meet the latest advance in price, and for the increase in railway charges and alteration in shipping freights; also, possibly, for an increase in price arising out of the present miners' dispute.

Coke and Breeze.—The latest increases in price must, of course, be met. If the full prices realized for export are to be taken into account, the new standard and maximum prices for undertakings exporting coke may not be acceptable without revision, and those in the export trade know the violent changes which take place in remarkably short spaces of time. The export market prices—over which the gas undertakings have very little control—may break at any time, and prices come down with a rush. There are many factors which may operate to bring this about—larger outputs of coal in Europe, greater exports of coal from this country, import of American and Australian coal by European countries (this has already commenced), or financial crises in the latter. On the other hand, after the new standard and maximum prices have been fixed, coke prices may still further advance and give the opportunity for larger dividends in the case of sliding-scale companies. One way in which the uncertainty could be met in these present abnormal times is to make, in the case of coke exporting undertakings, the new standard or maximum prices to slide for a limited period to the same extent as the variations in the realizations per therm for coke and breeze. Let me say here that the export of coke is not always a thing to be desired as against landsale. On an average of pre-war years, less prices were obtained for export than for landsale, and this may occur again, and there are districts which cannot absorb by landsale the whole of their make. For certain works export in some districts has been entirely stopped.

Tar and Ammonia.—These are also uncertain factors, but are not likely to affect the results to anything like the same extent as exported coke.

Oil, Coke, and Breeze for Water Gas.—These will require adjustment in most cases for variations in prices.

Salaries and Wages.—In all departments and in all cases these will require to be rectified. We do not know what the results of zoning and grading are likely to be, nor do we know how wages and salaries may be affected should the cost of living continue to increase.

Repairs and Maintenance (Manufacturing and Distribution).—Adjustments will be required here, because the figures for this year will show extraordinary variations on a comparison of undertakings. These variations are due to undertakings carrying out arrears of repairs which they could not carry out during the war, while some made money provision for it in their accounts for the periods during which the arrears were accumulating, and some did not. The cost, representing a normal amount of repairs, can be met by taking a percentage increase over the pre-war cost of repairs. Further adjustment is required in those cases where full provision has not yet been made to meet arrears of repairs. Otherwise these undertakings will have to pay for the deferred repairs with a standard fixed which did not make provision for them. This can be met by calculating what the total cost of repairs and maintenance would have been if for each year since the commencement of the war were added to the pre-war costs the percentage of increase in wages and principal materials ruling in the year and the total for the whole period compared with the total actually charged. If the latter is less than the former, the difference would represent the arrears; and an addition limited to the estimated period for carrying out the arrears of repairs could then be made to the standard or maximum price. The percentage principle for arriving at the amount representing deferred repairs has been applied by many industries for other purposes; and the percentages could be agreed and applied to all applications.

Rentals of Meters, &c.—Where increases have taken place, and are not fully reflected in the accounts, adjustments will be required.

Rates and Taxes.—Adjustment will be needed to meet the latest increases.

War Bonus.—It is evidently desired that this should be shown separately; but many undertakings have not kept separate records, and I am afraid cannot give separately the actual figures.

Capital Charges.—The new standard and maximum prices will include provision for the pre-war dividend, as the form works down to show the pre-war profits available for dividend. It is to be remembered that increases in sales of gas will require more capital expenditure per 1000 c.ft. or per therm than in pre-war days, and that the cost per cent. of such capital will be higher.

Therefore, a higher rate of profit is necessary to meet this. At the present time, the cost of new plant is such that it takes the whole of the pre-war rate of profit per 1000 c.ft. to pay the interest upon the new manufacturing plant, leaving nothing for distribution capital.

I cannot at this date profess to know how the Board of Trade propose to deal with the figures which are provided in the schedule; and I am therefore writing with this disadvantage. But I imagine they will convert the present standard and maximum prices, and also the pre-war and present-day adjusted costs, into therms, adding to the standard or maximum price per therm the difference between pre-war and present-day costs. This involves the settling of the pre-war and present-day calorific values of the gas supplied. Most of the undertakings in the pre-war period would be supplying gas under illuminating standards; but possibly a table for the conversion of illuminating standards to calorific values could be agreed upon. Several undertakings which I know of have since the pre-war period put into operation new and more economical plant. They certainly ought not to lose the benefit of this good management, which, but for the war, would have resulted in them being in a position to sell gas cheaper and, so far as sliding-scale companies are concerned, pay higher rates of dividend. This adjustment can, of course, be dealt with when adjusting the items referred to above.

The new standard per therm having been arrived at, there is the question of what fraction of a penny is to be adopted in charging for heat units, and how the increments of dividend are to be calculated for different declared qualities of gas. I will not spend time on these, but refer you to the thoughtful article in the "GAS JOURNAL" for Sept. 29, by Mr. Herbert E. Ibbs, the Chief Accountant to the Gas Light and Coke Company, and Editor of "Field's Analysis." I agree with him that 0·2d. is a better working figure than ¼d.; it has greater flexibility. Electric companies use the decimal 0·02d. for their sliding-scale of charge; and some workmen are now paid in rates showing decimals of a penny. We are gradually coming to the decimal system. The therm is based on the decimal principle. Mr. Ibbs also deals in the same article with the question of the charge for prepayment fittings.

In this week's "GAS JOURNAL" there are correspondence and further articles on these questions which will well repay very careful study. "Engineer" gives some most useful calculations. He also makes a good point, among others, in regard to an extra sum for the maintenance of slot-meter installations.

In the settlement of all these points a broad and honest policy should be adopted by all parties, and narrow views should not be allowed to have sway. I believe the Board of Trade will endeavour to deal justly by all parties; and in doing so they should not lose sight of the fact that the gas industry suffered financially during the war in a most exceptional manner, and that, as regards sliding-scale companies, if the shareholder receives an increased dividend, once the standard is fixed the consumer receives a still greater benefit in the price of gas.

I hope the Act is sufficiently wide to enable the Board of Trade, where desired, to alter the principles of the existing sliding-scales in such a way as to allow the employees to partake in the benefits of reductions in price below the standards.

PRESSURE.

In regard to minimum pressure, there has been much discussion, which is familiar to all; and I am afraid we are not done with it, as the Act gives power to the Board of Trade to specify different minima for gases of different calorific values. On this, the railway companies will probably renew their endeavour to have specified a *pro rata* increase of minima of pressure for gas of calorific values below 500 B.Th.U.

CARBON MONOXIDE AND INERTS.

As to the inquiry which is to take place into the question of whether it is necessary to prescribe limitations of the proportion of carbon monoxide and of incombustible constituents which may be supplied in the gas, I think we have nothing to fear if the inquiry is a fair one. And there is no reason to doubt that it will not be so. The carbon monoxide question was disposed of many years ago, and should not have been heard of again. As to inerts, when selling on a heat-unit basis, the consumer is protected, because he will only pay for the number of heat units supplied to him, whether the gas is "stretched" or not.

TESTING.

In regard to the testing of gas, it is to the benefit of all that we are to have uniform conditions throughout the country. Local authorities owning gas undertakings may find, under the new Act, that they have not the immunity from testing which they have experienced in past years, as any five consumers may apply to Quarter Sessions and have a gas examiner appointed; and the local authority must remunerate him. It is well known that in many cases the gas was never tested.

At the time of writing, it is not known who the Gas Referees are to be, nor have we any information as to what they will prescribe under section 5. We ought to have some notification at an early date.

FORFEITURES AND PENALTIES.

There are plenty of these, and they are quite plainly set out in the Act.

SPECIAL ORDERS.

Under section 10, the Board of Trade have power to make Special Orders for anything which, under the Gas and Water Works Facilities Act, 1870, or any amending Act, may be effected by Provisional Order. Undertakings cannot obtain as wide powers under a Provisional Order as under an Act of Parliament, but may obtain powers for the following:

(1) Construction, maintenance, and continuance of gas-works or water-works for the mannfacture and supply of gas or the supply of water in any district within which there is not an existing statutory gas or water undertaking.
(2) To raise additional capital necessary for the above purposes.
(3) To enable two or more undertakings supplying gas or water to enter into agreements jointly to furnish such supply or to amalgamate their undertakings.
(4) The provisions of the Gas-Works Clauses Acts, 1847 and 1871, apply, as these Acts are incorporated in Provisional Orders.

Under the Gas and Water Works Facilities Act, notices must be given by certain dates in each year, and documents deposited by other specified dates. The Board of Trade will then consider the application, and any objections thereto that may have been lodged, and determine whether or not the undertakers may proceed with the application. Not later than April 25 of the following year a Bill must be introduced into Parliament for an Act to confirm Provisional Orders, which are set out at length; and until confirmation by Act of Parliament the Provisional Order is not in operation. While the Bill is pending in either House, petitions against the Provisional Orders comprised therein may be made, and the Bill be referred to a Select Committee, in which case the petitioner will be allowed to appear in opposition, as in the case of a Bill for a Special Act. Now, however, any powers which can be obtained under the Gas and Water Works Facilities Act, 1870, and the amending Act of 1873, may be effected, so far as these refer to gas by a Special Order under the Gas Regulation Act. The procedure, however, is different from that of Orders under the first portion of the Regulation Act.

Special Orders are to be laid in draft before both Houses of Parliament; and an Order shall not be made unless both Houses, by resolution, approve of the draft.

The remaining portions of the Act are of a general nature, and relate to gas-meter testing, accounts, and returns the Board of Trade may require, the making of rules by the Board, and definitions, &c., and need not be commented upon.

In conclusion, I would say that with the Act fairly and reasonably administered there is a bright prospect for the full development of the industry. The consumer may have to pay a little more for his gas in order to bring back the industry to the stability which was destroyed during the war; but the consumer would eventually suffer if this is not done. He will not suffer by the change in the system of charging—he will gain, because of the industry being set at liberty to supply the heat units which the consumer requires in the most economical form, instead of being bound to supply a prescribed calorific value, which could only be altered by Act of Parliament. In referring to the price of gas, it should be remembered that, speaking generally, prices have not increased in anything like the same proportion as other commodities.

I cannot conclude these hurriedly prepared, and not at all exhaustive, notes without paying tribute to Mr. Milne Watson for the great work that he has done in aiding the passing of the Act. He gave a large amount of time and thought to it; and his great ability and tact were of the utmost value. On many occasions the outlook was overcast and very obscure; but Mr. Watson persevered, and would not be discouraged. With the result, he should be very proud indeed.

Discussion.

The PRESIDENT (Mr. Arnold W. Branson), opening the discussion, said they were much indebted to Mr. Ridley for the time that he had devoted to his subject, and for the practical and useful review of the Act he had given. They also remembered, at the same time, the spade work he had done in the earlier days on the question of financial hardships, and which had matured in the shape of the financial provisions of the new Act—where provision was made to modify the powers in regard to the payment of dividends. Everybody would agree that the Act, as a whole, was, as Mr. Ridley had said, good, not only for the industry, but also for the consumers. It was good, too, for the first applicants, who at present were suffering financially. One of the difficulties of carrying out the Act would be in respect of the form of the account to consumers. Personally, he did not see why there should be so much calculation shown on the face of the account. The British thermal units could be made sufficiently apparent on the face; while on the back of the account there might be a paragraph in bold type showing the guaranteed calorific value of the gas per therm, and what the therm was. Experience, however, would show the best method of dealing with the accounts. The question of a minimum dividend did not yet seem clear—it did not show whether it was guaranteed by the provisions of the Act. It was certainly not so definitely provided for as in the South Metropolitan Company's Act. The maximum dividend or standard price would be one of the most difficult things under the Act. Mr. Ridley had suggested, regarding the new standard and maximum prices, that they should be varied on a sliding-scale for a limited period to the same extent as the variations in the realizations per therm for coke and breeze. This was, that they could take the standard price and apply for a revision of it from time to time. This would probably affect undertakings in their neighbourhood, where at present they were deriving biggish profits from the export of coke. Capital charges should be well covered, as they would be an increasing burden on undertakings as time went on. In regard to testing, one would gather from the clause in the Act that it would be a continuous

test on which penalities would depend; and as to the calorimeter, he had misgivings of anything in the nature of a continuous recorder.

Mr. S. SHADBOLT (South Bank) said one point had occurred to him in respect of the adjustments which they anticipated would be made. He would like Mr. Ridley's opinion on this matter. It was stipulated regarding applicants that, in addition to the fees payable by the companies applying, any extraordinary expenditure incurred by the Board of Trade in connection with the local inquiry should be paid by the undertaking applying. His own opinion was that the Board of Trade would not be likely to go into local inquiries if there was to be what one might describe as frivolous opposition.

Mr. J. KELLY (Bridlington) said that during the war many undertakings had water-gas plants, and others had installed them at the instruction of the Government in order to conserve coal. He would like to know if these undertakings would be under any disability in charging by the therm. If, in consequence of the therm method of charging, they reverted to the coal cost entirely, they would certainly be under a great disability. The cost of manufacture might, it seemed, be placed on the war-time cost.

Mr. F. H. ROBINSON (Harrogate) said, arising out of the point in discussion, he had made an interesting calculation. In his case, in 1913 they manufactured 320 million c.ft., and in 1919 392 millions; and they had sold more therms in 1913 than in 1919. The calorific value in 1913 was about 600 B.Th.U., and in 1919 480 B.Th.U. If they took the standard price of 3s. calorific value on 600 B.Th.U., they had a standard price of 6d. per therm; if they supplied 450, the standard price was 8d.

Mr. R. WOOD (Barnard Castle) asked if it were possible to go for an Act first without having at the outset to get a Provisional Order.

Mr. NORMAN S. COX (Sunderland) remarked that companies on the sliding-scale who before the war were paying small dividends, and who had improved their position by improved methods of organization, and thereby improved their dividends, would have to be taken into consideration when working under the new Act.

Mr. W. W. ATLEY (Stockton) said he agreed with the President on the question of the recording apparatus, which was a very intricate one. It would be easy for a gas undertaking to be penalized if there were the readings of only one recording apparatus. It seemed to him it would be necessary to have two calorimeters, or even more.

Dr. J. T. DUNN (City Analyst, Newcastle) said it would appear that the readings of the calorimeter should be checked by the periodical visitation of a gas examiner; but he did not know whether the small undertakings would be able to do this. In Newcastle, he tested gas once a week; and the continuance of a weekly verification of the recording apparatus would afford pretty good protection. But this might not be possible to small country gas undertakings. The large undertakings in the big towns would be able to see that their calorimeters were kept in order. It had been a matter of disappointment to him that the new unit therm had been advised in dealing with accounts. From many points of view the existing Board of Trade electricity supply form of account could have been used, and gas could have been charged for not in 100,000 B.Th.U., but per Board of Trade unit. To have got a unit of suitable size would have been a simplification to the public, instead of having to pay for their electrical power in one unit and to pay for gas power in another unit. The Board of Trade unit was a metric unit, and the adoption of anything which brought them nearer to the metric system was to be approved.

Mr. C. DRU DRURY (Sunderland) asked if any special form of recording apparatus had been prescribed.

Mr. RIDLEY, replying to the discussion, said, in reference to Mr. Shadbolt's question as to the expense of local inquiries, he was not able to say anything officially, but he believed it was the idea of the Board of Trade not to have local inquiries where objections were of a frivolous nature. In regard to the President's point with regard to the simplest way of showing the account, he said they must indicate on the account the number of therms which the consumer was to be charged. As to the question of a suggested sliding standard, he suggested this only for a limited period. While it was quite true that the price of residuals would fluctuate, he did not think they would fluctuate to the same extent that exported coke fluctuated. Coke was in such an abnormal condition that they did not know how long it would last, or how long it might be before the price came down with a rush, as no other residual would. Therefore he suggested a sliding standard for the fluctuations of coke only. In regard to the question raised by Mr. Kelly, as to present-day cost as compared with pre-war costs with two entirely different qualities of gas, he could not say how the Board of Trade were going to deal with the figures when they got them in the schedule; but what he thought the Board would do would be to work out the pre-war quality of gas per therm, and do the same thing with the present-day quality of gas. Having obtained the cost per therm, then the adjustment could be made to the pre-war standard price. In regard to Mr. Wood's question as to Provisional Orders, the Act referred to was not an Act brought in by an individual company or undertaking, but was an Act known as a confirmation Act, brought in by Parliament itself, for confirming a number of Provisional Orders in one confirmatory Act. In regard to the point raised by Mr. Cox as to companies who had improved their conditions, he considered that this should be taken into consideration, as he had mentioned in his paper. There was one thing that should be taken into account, and that was that a large number of undertakings brought into operation (in the early part of, and just previous to, 1914) very largely improved and more economical plant; and these undertakings should not have to meet any loss in respect of their enterprise. If he understood Dr. Dunn's remarks aright, it was that it was a hardship upon the small undertakings to have a continuous calorimeter. There was, however, a sub-clause in the Act which provided that it was not necessary to have continuous records for undertakings with a less output than 100,000,000 c.ft. per annum. Mr. Ridley concluded by saying that he had been asked by Mr. Lees to state that those undertakings which had experienced financial hardship and were anxious to make early application, should communicate with him (Mr. Lees), as the matter was to be considered by the District Board of the National Gas Council for the selection of the first applicants in the district before next Thursday (to-morrow).

DISTRIBUTION PROBLEMS OF TO-DAY.

Discussion at the Half-Yearly Meeting of the Eastern Counties Gas Managers' Association.

At the Meeting of the Eastern Counties Gas Managers' Association on Thursday last, at the Liverpool Street Hotel, London, there were no papers for discussion; but to different members had been allocated the duty of opening discussions on various aspects of gas distribution. It was at the outset explained by the President (Mr. A. W. Sumner, of Grays) that on this occasion it was intended to depart from the orthodox method of having papers read; and, instead, to have discussions on various interesting subjects relating to distribution. He was afraid the distribution of gas often got neglected at their meetings, because there were so many other current matters with which to deal in connection with gas manufacture. It was, however, no use making gas unless they could sell it. He would call upon Mr. Auchterlonie to open the discussion on the first topic, and, in conjunction with this, as it was on a kindred subject, the contribution of Mr. Troughton would be taken. Mr. Troughton unfortunately could not be present; and so his notes would be read by the Hon. Secretary, Mr. W. H. Mainwaring, of Lincoln.

(1)

Mr. J. W. AUCHTERLONIE, of Cambridge,

ON

METERS: HIRE RATES, REPAIRS, AND DEPRECIATION.

The subject of "Meters, Hire Rates, Repairs, and Depreciation," which I have been asked to introduce for discussion this afternoon is not an unimportant one at the present time; and I think it is worth having some time devoted to its consideration.

The cost of new meters and the charge for repairs of defective meters have increased by 140 p.ct. over pre-war prices. Knowing the number of various sizes of meters in use in Cambridge, I find that to replace the 7945 ordinary meters at present let on hire would involve, at current prices, an expenditure of £35,336, equal to a capital of £97 9s. per million cubic feet sold through our ordinary meters. The interest on this sum, at 7 p.ct., would amount to 1·6d. per 1000 c.ft. sold.

In former years there was considerable diversity of opinion and practice in charging meter-rents. Even to-day, according to the latest available returns, there are undertakings (more especially among those owned by public authorities) that do not charge meter-rents. Mr. Mason, the Secretary of the "B.C.G.A.," informs me that, as a result of an inquiry issued by the Association in the early part of this year, he found that out of 153 undertakings that sent in replies, 40 did not charge any meter-rents. The "Gas-World Analysis of Accounts" shows that of 52 gas companies, only two do not charge meter-rents; whereas of 67 municipal undertakings 42 do not charge meter-rents, and of the remaining 25 some charge what must be only nominal rentals. I think I shall be able to prove that, in the case of undertakings not charging meter-rents, they are giving free service equal to 3d. per 1000 c.ft. on all new meters that are being fixed, and adding this amount to the selling price of the gas.

In pre-war days—when the price of gas was low, the price of plant and appliances cheap, and capital could be borrowed at a small rate of interest compared with present conditions—it was a common practice to have differential rates for gas used for various purposes, and give concessions in the form of free service in the fixing of cookers, fires, and other appliances. Therefore to give a concession in the form of a free loan of meters, or at a rental less than cost, was not so material as it is at the present time. It was then a matter of policy or expediency, designed to promote expansion of business, and thus to enable undertakings to utilize their existing plant to its full capacity, or to instal additional or convert old plant on modern and economical lines. The expansion of business to-day, if it involves the enlargement of the gas manufacturing plant, is not the desideratum that it was previous to 1914. The high cost of apparatus, material, and labour, and the high rate of interest that must be paid to secure capital for extensions to gas-works will result in the standing charges reaching such a level as would have been inconceivable before the war.

I venture to think that the opinion of the members here to-day will be that, if the price of gas is to be kept within reasonable limits, free service and concessions must be curtailed, and as far as possible the public made to pay for all service rendered over and above that for gas supplied. In the case of meter-rents, this is quite legitimate. The Gas-Works Clauses Act, 1847, empowered undertakings to let for hire any meter for such remuneration in money as shall be agreed upon. The Metropolis Gas Act, 1860, definitely laid down that the meter-rent should not exceed 10 p.ct. on the net cost of the meter. The Cambridge University and Town Gas Act, 1867, has a similar clause, limiting the meter-rent to 10 p.ct.; and as this Act is construed with the later Acts, the Company that I serve is limited to 10 p.ct.—a rental that is not adequate for meters fixed at the present time. The Gas-Works Clauses Act, 1871, will be found, however, to govern most undertakings; and this Act reimposes the clause of 1847 Act giving undertakings the right to charge such rental as may be agreed

upon, or alternatively for a consumer to purchase his own meter, and keep it in repair.

Now what should be considered an adequate meter-rent at the present time? Mr. Mason tells me that his returns show very great variation in charges made. They range from free meters to 33⅓ p.ct. rental. I contend that nothing less than 15 p.ct. on the net cost of meters purchased to-day will prevent gas undertakings incurring a loss. This figure is arrived at by taking 7 p.ct. interest on the net cost of the meter, and 8 p.ct. for repairs and renewals.

I consider that all meters should be overhauled and repaired every twelve years. I have not been able to carry this out during the past four years; but as late as 1916 I find that 7·74 p.ct. of our ordinary meters were sent to the makers for repairs. I had hoped to go even further than this. I was gradually working-up to changing meters every six years. If they are found correct, they would be fixed for another period of six years, after which they would be sent to be overhauled. I have already stated that gas undertakings must at the present time pay 7 p.ct. to secure capital for the purchase of new meters, and this rate of interest in any case is equal to 1·6d. per 1000 c.ft. of gas sold.

If, therefore, you agree with me that the remunerative life of a gas-meter is twelve years, and that repairs at the end of that period are usually so extensive and costly that it is exceedingly doubtful if the revenue from meter-rent afterwards does more than meet the cost of repairs, then we shall have satisfied ourselves that the total cost for interest, repairs, and depreciation for meters purchased at the present time will be equal to 3·4d. per 1000 c.ft. of gas sold.

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(2)

Mr. J. H. TROUGHTON, of Newmarket,

ON

COOKERS; HIRE RATES, HIRE PURCHASE OR SALE; REPAIRS AND DEPRECIATION.

The subject of hiring-out gas cookers either on simple hire or on a hire-purchase system is one which to-day demands very careful consideration. The present high cost of the new article, and parts for repairs, is a serious financial hardship imposed on gas authorities and their customers. In 1919 my Company increased by 50 p.ct. the hire-rates of all cookers then on hire, owing to the greatly increased cost of repairs, both of parts and labour. Since then both have gone up by leaps and bounds; and it is a question to-day whether, on account of both these items, the hire-rates should not again be increased. I venture to think that 100 p.ct. on pre-war rates is justified on the cookers fixed in pre-war days, for no other reason than the increased cos of parts, and the labour involved in keeping gas cookers in good working order.

When one compares the present cost of high-grade cookers which have not been advanced in price in comparison with medium or low grade cookers, it is obvious that a rent must be charged on them, commensurate with the outlay involved, based upon their probable lifetime and the high rate of interest required on the capital involved, for the hiring-out of high-grade cookers, so that where hire-rates in 1914 were based at a nominal figure it is quite reasonable that the rates should also be 100 p.ct. more. One naturally has to base the rent on the probable lifetime, of which there can be no hard-and-fast rule, inasmuch as one person hiring a cooker will keep it scrupulously clean and in good working order (which always means better results), while another person treats it abominably, and thereby shortens its lifetime—to say nothing of the bad results obtained.

I have practically ceased hiring-out the so-called cheap cookers of pre-war days, which many undertakings used to supply with their prepayment installations, either free of cost, or at a quarterly hire-rate of about 1s.; and no doubt many other gas undertakings have done the same on account of the greatly increased cost of them and of the parts for repairs which are considerably more costly in proportion to the high-grade cooker parts, and which in my opinion puts the small or so-called cheaper cooker out of court as a business proposition. I make a rule to recommend my customers to purchase whenever possible a good medium-grade cooker outright, which I am willing to sell very close to cost price, or acquire it on a three years' hire-purchase system. The customer signs a simple agreement to purchase a cooker by making twelve quarterly payments based on the net cost *plus* 5 p.ct. interest, which latter figure is an average of 10 p.ct. if payments are made regularly, which is, of course, insisted upon. The hire purchaser undertakes that the cooker remains the property of the Company until the last instalment is paid, when it becomes his absolute property.

This brings me to the question of a standardized prepayment cooker. There can be no doubt that if such a cooker were produced it would be a boon to gas undertakings generally of immense value to the community, and should mean good business to the makers.

As a rule it would be found a medium-grade packed cooker would fill this gap, with a fair-sized oven, a good griller burner, a simmering burner, and two good rings. Of course, this idea of a standard cooker might not suit every district; but one such would, I think, suit the Eastern Counties and might be called the "Eastern," while other standard sizes might be agreed upon to suit the Northern, Southern, and Midland districts. And perhaps Yorkshire and Lancashire might require one to suit their peculiar requirements, where most of the people bake their own bread, and generally expect to get more out of a cooker than we do in the east or south.

There is no doubt a standard cooker is badly wanted at the present time. I believe there are many thousands of gas consumers waiting for it. It would be welcomed in every district, because it could be produced and sold cheaper, on account of the large number required, and upkeep would consequently be much reduced.

DISCUSSION.

FAULTY METERS—PREPAYMENT METER TOKENS.

Mr. H. G. RUGGLES (Leighton Buzzard) said he was interested in Mr. Auchterlonie's paper, because at Leighton Buzzard their meters had been causing them a great deal of trouble. The number of faulty meters had increased by over 100 p.ct. since 1914; and it had gradually been getting worse and worse. From some figures that he got out recently, he found the causes of faultiness in the case of 100 meters were as follows: 30 p.ct. gave gas free, 40 p.ct. had stopped registering, 12 p.ct. were leaky, in 14 p.ct. coins had stuck, and 4 p.ct. were slow. There must be a reason for this great increase in the number of defective meters; and he should like to know whether it had been the experience of gas engineers in other parts of the country where water gas had been adopted that there had been a greater increase in the number of faulty meters since. In his own case, he had found a large percentage of their meters had stopped registering. He should like to learn whether the oil-spraying of meters had been found efficacious. Something would have to be done in regard to increasing meters rentals, because the cost of repairs had gone up 1½d. per 1000 c.ft. compared with 1914.

The PRESIDENT said he wanted to get some information on the point as to increasing the meter-rentals, because at Grays they had done nothing in this respect, either in the case of meters or stoves.

Mr. F. A. WEST (Newark) remarked that he could sympathize very much with Mr. Ruggles, because he himself had had similar trouble with dry meters; and the unaccounted-for gas had been going up to an alarming extent, until at the present time it was about 12 p.ct. Of this 8 p.ct. was entirely due to dry meters registering slow, or stopping registering altogether. This was a serious matter with them; and so he had got into communication with Prof. M'Candlish, of Leeds University. He was the Professor in connection with the leather industries. He (Mr. West) had written to him to see whether they could not get over the difficulty in a satisfactory way, by preventing the hardening of the leathers, which was evidently the cause in their case of the meters registering slow. He had also been in communication with several meter makers; but he had not obtained much satisfaction from them. So far as he could see at present, his trouble had been almost wholly due to admitting fairly large quantities of oxygen in the gas during the last few years to keep the purifiers clean. They had very small purifiers; and the consumption of gas had grown considerably the last few years. It was therefore only by admitting a large percentage of air that they could carry on. This had gone up in some cases to an extent that it had given them 3 to 4 p.ct. of oxygen in the finished gas the last few years. He thought this had been the cause of a great deal of their trouble. On opening many old meters, and comparatively new meters—meters purchased in 1918—he had found them badly oxidized. There were also traces of naphthalene and sulphur; and the leathers were comparatively hard. The meters were registering slow. He had taken twelve meters at random; and they averaged 15 p.ct. slow. There was not one correct, and not one fast. They had tried spraying with paraffin, with benzole, and with all kinds of oil; but they had not been able to do anything that had been of any real use. Prof. D. M'Candlish told him, in reply to a letter, that it was impossible to really soften the leathers properly unless they could remove all the oil first, and make the leather perfectly white and clean again, and then re-treat it properly with almond oil. If anybody could help him in any way, he should be glad.

Mr. T. GLOVER (Norwich) remarked that anyone who would take the trouble to go to a meter works, and see the condition of their own meters and meters from other works, would get some interesting information. A little time ago he took an opportunity to go and see the condition of some meters under repair, and he found that his own were in a nice liquid state—the valves were lubricated, and the leathers soft. Of course, this was very gratifying. He also saw meters from much larger works which were very dry, and the leathers were hard; and he should not wonder at all if the measuring capacity had been badly affected by the condition under which they had been working. He thought the remedy was to start at the works' end, and not try expedients for moistening the meters by such means as spraying and so on. In his opinion, the gas should be of such a nature that it contained its own lubricant. It was fortunate it could be so. But the gas might be of such a nature that it would extract the oils from the leathers, and would leave the surfaces of the valves perfectly dry. It was possible to get gas in that condition. The remedy was to make gas that contained its own lubricants. It could be done. The way to do it was to fill the retorts with coal, and not draw in air and furnace gases. They should make honest coal gas, and leave the oxygen out, or only take in what could be absorbed by the purifiers. That was the simple remedy. Of course, it was quite clear they ought not to have 4 p.ct. of oxygen in the finished gas; and the remedy was to put in larger purifiers. The purifier makers would be glad of this information. [Laughter.] Working on small charges, drawing in furnace gas, working on unsealed retorts and having a vacuum, led to a large amount of trouble. If they thought of what was going on inside the retorts—when they got retorts in that condition—they were really burning the coal, and making producer gas, and that was not the material that would carry lubricants to the meters. It was possible to keep the meters in a beautifully lubricated condition if the gas was kept pure, and if it carried its own solvents. Gas, properly made, had naturally a quantity of oil in it, and would carry those oils to the consumers' meters, and keep them in a good condition. This was

what he advocated in the matter; and he could tell them that his unaccounted-for gas was less than 4 p.ct.

Mr. F. PINDER (Hatfield) said the last speaker had referred to the condition of meters seen at a meter works. His own experience was somewhat similar. At a meter manufacturers, he saw a meter in a very bad condition, and on it was chalked the name of the town whence it came. He made it his business to look into the matter; and he found the make per ton at those works was something like 15,000 c.ft. Probably this accounted for the bad condition of the meter. The question of the registration of meters had also been referred to. In recently testing some meters brought in, they found that at 15-10ths pressure they registered accurately; but at 3-in. pressure they registered erratically—something like 20 p.ct. fast, and some quite the reverse. There was need for meters being tested under pressures similar to ordinary working conditions.

Mr. W. W. TOWNSEND (Colchester) said Mr. Ruggles seemed to lay his meter troubles at the door of his water-gas plant. Their friend at Leighton Buzzard had lately gone in for water-gas plant; and his troubles with meters had come about recently. He coupled the two things together; and he (Mr. Townsend) wanted to say a few words to prevent this impression becoming general. There were hundreds of works using water gas, without trouble in regard to their meters; but there must be something to account for the experience of Mr. Ruggles. It was very likely that it was due to the extraction of benzole from the gas during the war; and he might now only be reaping the harvest. But it was not fair to accuse water gas of having the result mentioned. There had been no reference to the research work done by the Gas Institution into this very question. The Committee and the chemists had gone into the matter very thoroughly, both from the chemical and physical aspects; and their researches had shown conclusively what were the causes of the troubles. One thing brought out in the investigation was that blue water gas containing sulphur dioxide had a bad effect on meter leathers; and therefore it was necessary that, if they were making blue water gas, the sulphur dioxide should be neutralized in some manner. This was usually done by letting the blue water gas go through the same purification plant as the coal gas; or if the water gas was carburetted a little, it would have the same effect. From his experience, he had no cause to say blue water gas had any bad effect upon the meters. Obviously the right scientific way of looking at the matter was that it depended on the kind of gas that was being made. Some gas had a very bad effect upon the meters. The last speaker, in seeking to find a clue to the difficulty, took the make of gas per ton. It would not do to assume that works making 15,000 c.ft. per ton were necessarily making bad gas. It was true that, if they had certain types of plant, they could not get 15,000 c.ft. per ton unless they over-pulled, and drew in a lot of oxygen. But it was possible to make 15,000 c.ft. per ton with some types of plant, and keep the inerts low. Therefore it was necessary to ascertain the type of plant that was in use before condemning the works for having a high make of gas per ton. Another subject to which he might refer, but which did not arise out of any item on the *agenda*, was this: The "Gas World" had referred to what was going on in Holland with slot meters. Gas undertakings there found a difficulty in collecting sums due from consumers; and they had introduced the token system. The article examined the matter with the view of seeing whether it would be a good thing to adopt the system in this country. The objections to tokens, it seemed to him, were very serious; and he thought on two grounds that they would be very reluctant to adopt the system here. When people wanted money to put into a slot meter, there was generally somebody in the house who could find it; but if a token was necessary, it might not always be found. If tokens were of uniform size throughout the country while the price of gas varied greatly, tokens would move from one town to another, and the system would break down, unless the tokens were of the same value everywhere, and the meters set to give varying quantities of gas per token; thereby retaining one of the present drawbacks—viz., the cost and trouble of frequent alterations of meters. But it did seem to him that something might be done as an alternative to continuing the present prepayment by means of bronze coins. His suggestion was that they should consider whether it would not be possible to get the Mint to produce a nickel or aluminium coin of the realm, of the value (say) of threepence, which would be suitable to operate meters. This, they might say, was a large order. The number of slot meters in use was very considerable. The amount of copper coin locked up at the present price of gas was enormous. The weight of coin which had to be handled over and over again was tremendous. There was a great difficulty, which most gas people were experiencing more or less, that there were certain makes of meters which could not be set below (say) 15 c.ft. per penny. But if the meters were operated by something of the value of 3d., they could easily make these meters work again. Instead of requiring them to be set to give 10 c.ft., they could be set to give 30 c.ft. for 3d. They could easily do this with the meters as they were constructed now. Even as a temporary measure, the token was a bad thing; and as a permanent measure, it would have a prejudicial effect on the extension of the slot-meter system. He threw this matter out as a suggestion; but perhaps there was some radical difficulty in the plan. The mere fact that there was such a tremendous weight of copper to be handled was enough to make them consider an alternative. One of his collectors told him he cleared £15 in half a morning—from nine to eleven o'clock. This was just about as much as any man could carry on his shoulder; and he had got the rest of the day to get through. It could, of course, be got over by arranging for other collectors to call with coin-carts, and so on; but this meant a great deal of expense and trouble. But a coin of higher value might solve some of the difficulties.

Mr. G. A. MALLETT (Ipswich) said he was not at all concerned with the points on which members had spoken; but he was very much concerned as to the principle of charging meter-rents, which they ought not to overlook. In Ipswich they used to charge a very moderate rental for meters; and when the meter makers increased their charges—legitimately no doubt—they felt it was necessary to do something. Though, as Mr. Auchterlonie had reminded them, they had had to pay anything up to 150 p.ct. increase on new meters and repairs, and although in Ipswich they only increased the meter rentals from 10 to 50 p.ct., it brought about a great deal of grumbling. He had had people come to see him about it; and they took up no end of time. They argued this way: "Why should we pay meter-rental. We are quite prepared to buy your gas on the same basis, or on the same lines, as we go into a shop to buy an article. If we go into a shop for a pound of sugar, the grocer does not charge us for the use of his scales." [Mr. GLOVER: He does.] Not directly, but in an additional charge. Quite a number of consumers argued on these lines. He (Mr. Mallett) had to point out that the Company were bound by certain statutory obligations, and were quite within their rights in charging meter-rent. When he told them the Company were charging them an extra shilling, but were paying away an extra half-a-crown, most of them left him very pleasantly. The large number of meters that had stopped in their town the last ten years had been a most serious matter. Apart from the cost, it had made people think that meters were a very bad lot. They said: "Here is my friend So-and-So; he tells me his meter stopped. Therefore, I shall never believe in your meters again." They had had many difficulties with slot-meters; and he did not pretend to understand the cause of them. But it occasioned no end of trouble and expense. The ordinary meters were not the only ones to suffer. They had more slot-meters than ordinary ones—he believed three times as many. They had plenty of these meters that continued to pass gas without registering it; and so the position they were in was that the people got their gas without payment. Therefore, it was up to the gas-meter makers to see how they could come to their rescue. The Company had, without any exaggeration, lost several thousands of pounds since the war by having to change slot-meters—by having to put in different change wheels, and not being able to get the wheels in proper time. If they were changing the price of gas in October, and they asked the makers to let them have the necessary wheels, perhaps it was nearly three months, through delay in the supply of the wheels, before they got the meters changed. Look at the loss of revenue that would take place in that time! If some inventive genius could bring out a meter which could be easily altered *in situ*, it would have his (Mr. Mallett's) most hearty welcome. He knew there were certain meters that claimed this could be done; but, unfortunately, there were many meters that were fixed which were not so easily altered. Coming back to the imposition of meter-rents, which he took to be the main point of Mr. Auchterlonie's contribution, he did not think they should put all this cost of the meters on the consumer, because when he got his account quarter by quarter he would be dissatisfied, if he felt they were mulcting him in a high charge for meter-rent. He thought it was far better to charge the 2d. or 3d., or whatever the figure might be, in the cost of distributing the gas, rather than charge the individual consumer too high a rate for his meter. This would only cause constant grumbling.

The PRESIDENT: If we accepted the principle of adding the meter costs to the price of gas per 1000 c.ft., it would make the ordinary large consumer pay a higher rental than the ordinary small consumer. It seems to me that in equity the reverse should be the case.

Mr. MALLETT: I do not, of course, mean the whole of it.

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(3)

Mr. THOMAS GLOVER, of Norwich,

ON

(a) WHAT FREE WORK SHOULD BE DONE FOR CONSUMERS, AND FOR WHAT WORK SHOULD A DIRECT CHARGE BE MADE? (b) WHAT MAINTENANCE SHOULD BE DONE WITHOUT A DIRECT CHARGE.

The governing principles controlling our dealings with the public who are gas consumers or those who wish to be or who are not gas consumers, but who ought to be, are, in my opinion, as follows.

SERVICES.—No direct charge should be made for connecting houses to the mains, unless the distance in private ground is unusually great, when special terms should be arranged either for a direct contribution to the cost or a yearly rent to cover interest on the abnormal expenditure. The amount of the direct payment or the agreed rent will depend upon the anticipated or actual consumption—that is, it might be agreed for the undertaking to refund part or the whole of the direct payment, or to cancel the rent if the consumption reached a certain figure. A good consumer requiring a long service laid free may easily be more profitable than a consumer with a house on the building-line in a poor locality.

METERS as a rule should be fixed free of cost or as a direct charge to the consumer. The cost of the material and time for fixing should be regarded as part of the cost of the meter for the purpose of calculating the quarterly meter rent. I do not think that any sound argument can be advanced in favour of so-called free meters. Those undertakings that embarked on this policy have had to provide safeguards in the way of minimum consumption, or else revert to a rental charge.

COOKING STOVES.—What has been said about meters applies to stoves. Free stoves with ordinary meters are a great mistake. It might quite truly be said that there are no such things as free stoves, even in towns where no direct rent-charge is made. The interest on the expenditure for stoves fixed without a purchase payment or a direct rent-charge, is paid by every gas consumer in the price it is necessary to charge for gas—even by those who either do not use stoves, or prefer to use and purchase patterns not let out free of direct rent-charge by the undertaking.

HEATING APPLIANCES.—It will greatly facilitate the acquirement of gas-fires, water-heaters, &c., if the selling price can be made to include the cost of fixing, or where these appliances are hired-out if the scale of rent can be based on the cost of the apparatus *plus* fixing. Would-be consumers of gas for heating

stumble at a high first cost of appliances, and particularly at an uncertain and feared high charge for fixing.

The principle we have to go on in all these matters is to give every facility we can devise to enable the public to realize the benefits of a good gas supply, without (if possible) adding anything to the price of gas to cover the cost of providing the facilities. The hiring of meters and appliances should be self-supporting, or better still on a profitable basis, and contributing a quota to a lower selling price of gas. Self-supporting facilities, and a reliable supply of gas at ample pressure, will in many cases increase the consumption per mile of main, and so reduce capital charges on distribution outlay. The price at which gas can be sold is thus beneficially affected by a larger consumption per mile of main, and by the absence of indirect charges in providing appliances for gas consumers.

The prepayment system owes its success to the principle of providing facilities. The coin device is a facility for easy payment. The fittings and cooker are facilities for ensuring a satisfactory consumption. The difference in the price paid per 1000 by prepayment gas consumers should, on the average, be sufficient to pay the interest on the extra expenditure, for which no direct charge is made to the consumer. The difference will vary with local conditions, quality, and the cost of appliances. The higher the average consumption per meter, the easier it is to make the margin of cash received match the interest on expenditure in providing facilities for consuming gas.

The amount of the difference paid over the ordinary price by the prepayment consumer to cover the rent of meter, stoves, &c., is not in my opinion one which can be equitably fixed by the Board of Trade, and should be left to the good sense of those responsible for the direction of the gas supply business.

In regard to the maintenance of gas consuming appliances, I am altogether in favour of systematic inspection and free up-keep as far as can be safely and fairly carried out. Lighting appliances, if they are to compete with electric lamps, must be kept in a high state of efficiency, and the bare cost of systematic cleaning and maintenance is the most we can expect or ask the consumer to pay. Cooking-stove burners should be cleaned and replaced whenever necessary free of cost; but to check wrongful use or dishonesty, payment should be required for the replacement of tins and other loose fittings.

Gas-fires on hire ought to be inspected and put into good order free of cost every autumn, ready for the winter service. An offer to do this at a nominal charge should be made to all consumers owning their own fires. The importance of such a service has been distinctly emphasized by the advent of electric radiators, and even by the use of gas-fires with delicately balanced burners and columnar radiating material. The highly efficient and pleasing fire when first fixed may soon become a very disappointing appliance by careless use and neglect. A gas undertaking honest to itself and to its consumers will not be content with making a satisfactory sale of gas appliances. This is only a means to an end—that being a more general use of gas and a more profitable use of mains, services, and meters, if not of works' plant.

If these principles be accepted, details of application can be settled by the management of each undertaking. We are now a long way removed in our policy and practice from the days remembered still by many present, when a charge was made for laying a service in a forecourt of a cottage, or anywhere beyond the building-line in a street, when there was a strict adherence to the deposit system, and no interest taken in the appliances used by consumers or in the duty obtained from gas consumed.

All the conditions at that time were against a popular appreciation and use of gas. Since the advent of a more enterprising outlook and practice, which came in with electric competition in the later eighties and early nineties, a great change has occurred in the facilities offered to consume gas. The newer policy and method have proved to be right financially and otherwise. Let us still pursue with vigour the course we have proved to be right, and be on the look-out for all new channels which are likely to increase the usefulness of our industry to the public. If we can manage to make the facilities we grant self-supporting, we thereby avoid accumulating additional charges against the price chargeable for gas.

DISCUSSION.

The PRESIDENT remarked that in pre-war times, they were told to do all sorts of things free; and now many of them were at sea to know what they should, and what they should not, do. It would be useful to obtain opinions, so that they could get down to some useful work during the coming winter.

Mr. W. H. PRICE (Cromer) said, rightly or wrongly, in his case they were doing hardly any free work. They were trying to get cooker-rents where a new slot consumer came along. They put him in a cooker; and they asked for a rate on top of the slot meter. He must say this did not work very satisfactorily. But on the other hand, they were out to try to do away with non-paying consumers; and it seemed to him that to whatever figure they put the hire rates, it was very difficult to get rid of these consumers. He should like to ask Mr. Glover whether he thought it would be possible to have a minimum rate for every consumer, both ordinary and slot. It seemed to him (Mr. Price), it might be one of the ways out of the difficulty. Another thing was they were trying to keep down expenses in every way on collection and so on; and any penny coin meter that they now sent away for repair, they had it made into a shilling-slot meter straight away. It seemed to him shilling-slot meters were preferable to penny ones, though he believed some companies were still ordering penny-in-the-slot meters. However, it appeared to him that the day for penny-in-the-slots was over.

The PRESIDENT said the subject was really a very interesting one because they were faced with the difficulty as to what they ought to do with their consumers in the future. It seemed to him personally that the best course was to do away with hire rates altogether, and get purchases made by the consumers. Mr. Glover referred to the fact that people were often driven away, when they were asked to pay a lump-sum down to become consumers. On the other hand, if they did purchase their apparatus they were likely to be better consumers, and take more care than if gas companies supplied everything to satisfy them. Mr. Glover remarked in conclusion: "If we can manage to make the facilities we grant self-supporting, we thereby avoid accumulating additional charges against the price chargeable for gas." It seemed to him that one just went against the other. If they were not going to charge hire-rates, he did not see how it could be self-supporting.

Mr. W. W. TOWNSEND (Colchester) said there was one point which might not be known to everybody present—it was not to him a little while ago. As they were aware, many companies were limited by Act of Parliament to an additional charge for prepayment supplies of 10d. per 1000 c.ft., or 1s. when a cooker was provided. These rates were insufficient at the present time. There was no possible doubt about that. A great many undertakings were neglecting the penny-in-the-slot business. They were not fitting-up installations, because they felt they were unremunerative. Well, in view of the discussion that day, he asked the question of the National Gas Council as to their position with regard to this statutory limitation; and they said that, under the Gas Regulation Act, a company might apply for the additional charge for slot-meter supplies to be increased. It was expressly mentioned in the Act; but one might not put this interpretation upon it at first sight. If they desired to ask for 15d. or 18d., the matter would be considered by the Board of Trade; and the opinion of the National Gas Council was that the Board would settle all these points with regard to the different undertakings. This should remedy one of the great difficulties in the way. He quite disagreed with the President as to the policy to be adopted. He thought in pre-war days they often did far too much for nothing. There was a desire to get extra business. Now, owing to the high cost of all articles, and the difficulty of raising capital, and so on, there was a tendency to do nothing—or, if anything was done, to charge up to the hilt for it. Well, personally, he thought this was rather a mistaken policy, and that it would be a fatal error to turn away business by insisting upon everybody paying cash for everything he had.

Mr. GLOVER, in reply, said Mr. Price had asked about unprofitable consumers. Well, unprofitable prepayment consumers were a trouble sometimes. He thought that where the consumers had been provided with a nice little cooking-stove, and only used the top burners occasionally, and had a poor average consumption over the year, the gas undertaking were entitled to take his cooker away, and supply in its place a boiling-burner. This was one way of reducing the loss on the unprofitable prepayment consumer. There were even cases of prepayment consumers where the average consumption did not pay the interest on the expenditure on the meter; and there were also ordinary consumers of the same kind. One could imagine a stable, with an ordinary meter fixed, where the consumption would be 1000 or 2000 c.ft. a year. If they paid the meter-rent, of course the gas undertaking had no case there; but was such a consumer paying interest on mains and services. He thought not. But there was this to be said for all these cases—they had to take things on the average. The profitable consumer was helping the lame duck next door; and so they had to put up with losses sometimes, and remember the law of averages. This was the best answer he could give Mr. Price. He did not think they could, from a strictly legal point of view, refuse to fix an ordinary meter, though they could a prepayment one. If he was within the legal distance of their mains, they would be obliged to give a consumer a supply of gas, even though they might consider him unprofitable. With regard to shilling meters, he was beginning to look into this question again himself. Seeing that a penny now purchased such a small quantity of gas, he thought there was a great deal to be said for a silver coin. They might be interested in an experience he had a few years ago. He was ambitious at that time to retain the small villa house gas consumption for lighting, and so went in for providing more tasteful fittings, a superior cooker, and a slot-meter. He thought it would appeal to their respectability to make it a shilling meter, in place of a penny meter; and possibly it did in a few cases. But they found the shilling meter was militating against the consumption. People who had pennies had not necessarily got shillings; and so the average consumption through these meters was less, although the Company provided more in the matter of facilities. Therefore, he was not very long in love with the shilling meter. It was quite possible that in these days, when there was—or had been—more money about, there would not be the same objection to the shilling meter as at the time of his experiment; but ever since then he had been in favour of penny meters. With regard to the President's remarks about facilities being self-supporting, he (the speaker) claimed that the facilities which he granted to his prepayment consumers were self-supporting. That was, the extra charge per 1000 c.ft., with an average consumption in the old days of about 12,000 c.ft., paid the meter rent, stove rent, and fittings rent. It was self-supporting. So with the ordinary gas consumer. He paid a meter rent which was adequate to meet interest on the cost of the meter and fixing. It was self-supporting; and it was a facility. He did not make the consumer buy his meter. There was no extra charge on the cost of gas because they had lent the consumer a meter. So it was with all these facilities. He did not want anything in these days to be added to the price of gas. ["Hear, hear."] Everything should be self-supporting, and not be a charge on the price of gas.

Mr. W. M. MASON (on being called upon) said it was really not in his official capacity as belonging to the British Commercial Gas Association that he was going to speak, but more as an old showroom man, who had had a good deal to do with free cookers in Glasgow. The subject of free cookers or free anything else was very debatable; but he thought the members, as engineers, had to take a rather longer view of things. It was easy to take the view that this was not paying, and that was not paying, and to get a blurred vision of things. It seemed to him that Mr. Glover had contradicted himself. He had said that free cookers should not be given, and free fires should not be given; and

yet in his reply he admitted that there were plenty of things unremunerative—that all meters did not pay, that a meter in a stable, for instance, was not remunerative. Suppose a business man like Selfridge were to look at every little detail, and cut out certain things which did not pay. Suppose he made the customers pay a penny every time they went to the top floor in the lift, and knocked off the motor transport because it was of itself unremunerative—as it must be from one point of view. It would not do. A business man must to-day look at the ultimate view. A gas engineer might be going to spend £10,000 or £100,000 on a new vertical retort installation; and this perhaps might be unremunerative if only looked at from one point of view. But as engineers and business men, they must look at the whole thing. It was better, he thought, to give free appliances—what they called free appliances—if it brought an increased demand for gas.

Mr. S. B. CHANDLER (Lower Sydenham), speaking as a visitor, said he did think, as a distribution man, that this was a very important subject. There did not seem to be any rule laid down by the gas industry generally as to what should be done; and he thought possibly that to a great extent it depended upon local conditions. In other words, it seemed to be more or less a domestic matter, although, of course, affecting the whole industry. With regard to the so-called free appliances, certainly this was a very grave question. On the point raised by Mr. Glover as to the selling price of appliances including fixing, he did not quite agree. Gas to-day was not, generally speaking, a luxury; and in the average home it was a necessity. He thought that consumers should pay for necessities. Personally, he did not believe it was difficult to convince a consumer that the modern gas-fire was worth purchasing, and when purchased was worth fixing. The reason why he was somewhat adverse to including the fixing of appliances in the cost price was that with one appliance there might be very great differences in cost. A gas-fire, for instance, might require fixing with 10 ft. of pipe in one place, and with 50 ft. in another.

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(4)

Mr. F. PRENTICE, of Ipswich,

ON

HIGH AND LOW PRESSURE SYSTEMS; ALSO BOOSTING.

Now, Sir, I understand the united brains of the late President and the Secretary are responsible for the little innovation we are having this afternoon, in the way of the discussion of short subjects. I understand we are to be allowed ten minutes in opening the subject; and then there is to be discussion on them. I most heartily support this idea, because sometimes papers—epoch-making as they are described at the moment—fizzle out in the waste-paper basket before very long. When, however, we meet face to face, probably there are some points that may be of interest to the speaker, or of more interest to the listener, and therefore we may get some practical help.

I am supposed to speak about pressures. I am not sure that I know much about them. The first duty of the gas engineer is to provide a sufficient quantity of gas of good quality. The latter, of course, we always do. The next thing he has to do is to see it is supplied at sufficient pressure to the person who wishes to use it. Now, I am fortunate in this subject in one way, and that is that whether you are responsible for a small works carbonizing a few hundredweights of coal a day, or whether you are responsible for a large works carbonizing thousands of tons of coal a day this question must equally appeal to you.

Pressures, of course, vary very much. I know of one works with a maximum pressure at the holder of 21-10ths; and there is no trouble in the town. It never has been more than 21-10ths. Every main, service, and meter is put in from that point of view. At another works quite near by, the pressure runs up during the cooking hours, from 11.30 to 1 o'clock, to as much as 70-10ths. The small man would call this high pressure; the man who has to produce it calls it low pressure. These subjects—high and low pressure and boosting—are somewhat intertwined; and it is a little difficult to separate them.

Now, what is high pressure? My definition would be anything above (say) 10 in., or a pressure exceeding that given by the weight of the holder on the works supplying it. I have given two illustrations just now which will emphasize what I mean. If you go above that pressure, you must use mechanical means for doing it; and that, under my definition, would be high pressure.

Gas, as you know perfectly well, is over a hundred years old, and mains which were of ample sufficiency for the work they were required to do when first put in have now become hopelessly inadequate. It is an astounding thing that within our memory nearly all the new uses of gas have become practical accomplishments. There are many men here to-day who remember the time when gas-fires were practically unknown. I think I remember the first gas-fire ever made. I believe I have got it. It was made by the late Ebenezer Goddard. Then there are geysers, and heaven knows what, for the use of the commodity which we produce. The consequence of all this is that our distribution systems have materially suffered. They are not equal to the work they are required to perform. One school says, "Enlarge your mains." Another says, "Increase your pressure." I belong to both these schools. A third school utters the magic word "boost." This possesses very different meanings; but I am strongly of opinion that only the direst necessity should cause one to break-away from the ordinary low-pressure system of distribution. Nothing is easier for the management or the engineer, nothing is more satisfactory for the consumer, and, above all, there is this enormous advantage that there are practically no labour charges connected with it. This last item is gradually assuming in all our minds most alarming proportions. So, it is well if you can in any way arrange to supply your customers by the old-fashioned low pressure—that is, the weight that the holder gives—without any mechanical means.

At Ipswich we have a bit of a boosting plant for high-pressure street lighting at 54 in. water pressure. In addition to street lighting we supply from this main a certain number of outside lights for shops; and I am bound to say the result is excellent. But, you know, this excellent result is only attained by unremitting attention. There are the engines to look after, the blowers to attend to, and the electric motor. There are the lamps themselves with their tiny nipples, which can be blocked-up with the finest particle of dust, the lighting by hand, and extinguishing. If I weigh these things together, and see the excellent results with low pressure lamp-lighting at the present time, I ask myself as to whether the game is worth the candle—or I must not say "candle," but "gas." I am not altogether going to express a strong opinion on this subject; but I say I sometimes ask myself this question, and I should hesitate to recommend gas companies to go in for any very extensive system such as we have in Ipswich. When the pressure of gas to your consumers is too low to be efficient, something has to be done. There is no doubt about that; and, of course, some gas-works which you know probably very well indeed boost-up the whole of their supply. They simply have large blowers and engines, and increase the pressure automatically at the works. I imagine they are compelled to do so. We are all driven to that sort of thing sometimes, for the simple reason that the number of mains and pipes, &c., in the ground, to say nothing of trams, concrete roads, and stone setts, make it a very serious thing indeed for some of us to enlarge our mains so as to carry the gas which we want them to supply. So we get over this sort of thing by boosting.

Then, of course, there is another plan, and that is to back-up a district where you suffer most from lack of pressure, and run a small high-pressure main to the area. This method has been under my very careful consideration as recently as this year. I have a large working-class district about two miles from the works. For twenty hours out of the twenty-four they have an ample supply of gas; but from 11.30 to 1, and somewhere about 4 to 5 or 6 in the afternoon, the pressure, owing to the enormous use of gas cookers, fires, and so on, drops to an utterly inefficient figure—so much so, that we have actually lost consumers with gas-engines, because they say they always have to stop their engines at 11·30 or 12.

My first idea was to have a system of high-pressure boosting, with a 4 in. high-pressure main, and so back-up the district two miles away. But I had to think of a great many things. The first thing was that I was going to lay out this money for only four hours out of the twenty-four. I then had to consider that it would be necessary to have gas-engines (duplicates), blowers (duplicates), a house to put them in, and not least a man in attendance. I had to find one, two, or possibly three, district governors, and sites for them, to reduce to a suitable pressure at the points required; and thus, after a great deal of thought, I was retrograde enough to go back to the low-pressure system, and laid a 12-in. main from the works. This has not only cured the trouble absolutely, but has provided for very large expansion. The question of excavation will naturally occur to everybody; but I found that there was not so very much to be saved here. The great saving was in the cost of the main. You have to cut your trench, and a man must be in it. You have the same bridges, the same tram-lines, and the same sewers to dodge. So in the end I came to the conclusion that there was not very much in that, and went back to the old-fashioned method, and am perfectly satisfied with the results.

There was one other thing which came into my mind. For a long time I shall know what the condition of the 12 in. cast-iron main will be. I shall know it after twenty-five or thirty years. But I was somewhat inclined to think the condition of the thin 4 in. steel main at the end of this period would be likely to draw forth from my successor language which he probably would not have learned in his Sunday School.

You will notice that several times in my speech I have seemed to have got labour costs in my bonnet, and so I have. Anything now that increases labour—which means wages—in my judgment should be avoided at all costs. ["Hear, hear."] I firmly believe it will pay any of us to spend £1000 or £1500 if thereby we can save the labour of one man. This applies not only to distribution, but to everything in our works. My own endeavour is to do anything and everything I can to reduce this item of expenditure, which looms so very largely in our balance-sheet and assists so materially in raising the price of gas.

DISCUSSION.

The PRESIDENT said they had heard Mr. Prentice before deal with high pressure; but he thought he ought to try and get out of their minds one thing Mr. Prentice had endeavoured to put into them. He had rightly stated all the things that would be required for high-pressure distribution, or using it as a boosting method, with the exception of labour. He (the President) had been running high pressure over a large area, as they all knew, for something like six years; and he had not had to have a man in charge of his engines. They worked absolutely automatically, and were installed in the ordinary exhauster-house. He had no engine-man, except that the boiler attendant occasionally peeped-in during the night. In the daytime the general foreman looked after it; and there was a boy for cleaning and doing the oiling, and so on. But as for any labour being necessary for high-pressure distribution, they could banish it from their minds. It would work absolutely automatically, if put in properly.

Mr. F. PATERNOSTER (Felixstowe) said he had a small district which he boosted. Some eighteen months ago, he found they were in difficulty with a district about 1½ miles from the works, during the cooking period, and also at breakfast time, and a little bit at tea time. At midday they found the lowest point was 7-10ths. It would have been a big expense to lay a long length of main to supply this district; and at that time they were not at the end of the war, and so did not want to spend too much money. Therefore they decided on a small boosting plant, and only spent about £350 upon it. It would deal with 20,000 c.ft. an hour. This had brought them very well through the last season, when, in August, they had an increase of over 30 p.ct. At the point where they previously had the lowest pressure of 7-10ths, they got in August, with this large increase, from 2 in. to 2½ in. They had no engine attendant. At the moment, the plant was not in duplicate. The results were very satisfactory; and he thought the installation had put off the expenditure on larger mains for some years to come. They were boosting up to 18 in. pressure.

(5)

Mr. JOHN TERRACE, of Lower Sydenham,

ON

GAS SUPPLIES IN CONNECTION WITH THE HOUSING SCHEMES.

The question of the trading policy of gas undertakings calls for very careful consideration at any time, but more especially now when we are emerging from conditions imposed on the industry by the stress of war; and the somewhat imposing list of subjects to be discussed this afternoon gives an opportunity for expressions of opinion on the policy in the past, its application to the present, and what it should be in the future.

Doubtless, this will have been pretty freely done before the discussion on gas supplies in connection with housing schemes is introduced, and ought to prove helpful to those who have not come to any definite decision on the matter for dealing with the gas supply to housing estates. It is hardly likely that any scheme can be devised which would be suitable for all undertakings; and even if it were, there is always to be taken into consideration the attitude of the local authorities. It would greatly simplify matters if the Housing Commissioners would give definite information as to what portions of the work done would be allowed as capital charges; but it is always difficult to do this on the introduction of any new scheme.

The policy of gas undertakings in the past—to shoulder the full burden of capital expenditure when supplying gas by means of a slot-meter—does not help them in claiming assistance from the Commissioners, although in some cases the electric wiring of the houses now being erected has been allowed as a capital charge. Prior to the war, it was quite a general practice to lay mains and service pipes, supply and fix meters, pipe the houses for a varying number of points, supply the necessary fittings and burners, and in many cases supply a cooker also. In return, an extra 9d. or 10d. per 1000 c.ft. was charged for the gas supplied through a penny-in-the-slot meter, and the arrangement was quite a satisfactory one—the extra amount charged yielding a fair rate of interest on the capital expended to obtain the business.

Now, however, conditions are altogether different. Gas mains, service-pipes, meters, cookers, fittings, and labour have increased in cost enormously; and even the praiseworthy endeavour to improve the design and surroundings of modern artizan dwellings has, by increasing the distance between the houses and from the roadway to the houses, added abnormally to the cost of mains and services. In many instances the housing estate is some considerable distance from the existing gas-mains; and the local authority, being owners of the electricity undertaking, are anxious to instal electricity. The manufacturing plant at the gas-works is already barely adequate, and any considerable increase in output will necessitate the installation of new plant at extremely high cost. There is difficulty in raising the necessary new capital, on account of the great delay of the Government in giving adequate relief from existing parliamentary restrictions to enable them to pay a reasonable rate of interest on capital invested in their business.

No doubt it is very desirable that the increase in revenue from extensions of distributing plant, and the fitting-up of houses, should give a fair return on capital expended; but the speaker does not think it is reasonable to expect that, in abnormal times like the present, extensions need give the same return as in normal times. In pre-war days the charging of 10d. per 1000 c.ft. for extra services given to slot consumers could be justified in most cases; and it is certain that to-day the difference does not represent anything like an adequate return. But unless the amount of new business obtained during the period of increased costs attains to a very large proportion of the total capital expended on this class of the business, it cannot very seriously increase the charge per 1000 c.ft.—reckoning the return on the total slot consumers. It may here be pointed out that the present general extra charge of 9d. or 10d. per 1000 c.ft. was fixed in the first instance by gas undertakings themselves; and it is only in comparatively recent times that the figure received parliamentary recognition. Whether or not the increased costs of installation, &c., will continue sufficiently long to seriously affect the figure, and necessitate an increase in the difference of the prices charged to slot consumers and ordinary consumers, would appear to be a matter for future consideration.

In cases where the housing estate is a considerable distance from any mains of the company, it may be possible to get the local housing authority to guarantee a reasonable return on the capital expended until sufficient gas is being used to justify the expenditure. In some cases this has been done.

Undoubtedly the most difficult cases are those where the local authority, as owners of the electricity supply, are desirous of wiring the houses, and only desire a gas supply for the cooker which the tenant is sure to demand. In normal times there would be little difficulty, because the tenant would be in a position to refuse to go into a house that was not provided with this convenience; but, in the present shortage of houses, he is only too glad to obtain a house on any terms. Many authorities are quite reasonable on this point, and agree to pay a proportion of the cost of laying the main and service pipe; and as the Housing Commissioners allow the cost of wiring the houses as a capital charge, they can most likely be induced to pass this charge also. But supposing they do not. Is it good policy to allow the houses to be completed without having gas laid on?

Surely we have sufficient faith in the goods we are selling to feel conficent that, once a gas supply is available in the house, we can obtain the tenant as a customer. The gas consumption on a cooker only will surely yield a better return on the capital expended than the revenue obtained from (say) three electric lighting points; and it is much easier to add to existing points of consumption than to get business which necessitates the fixing of a meter and laying the necessary service-pipe. Nevertheless the lighting load is still the mainstay of the gas industry; and it behoves us to use every endeavour to fight to the utmost for our ideal of an "All-Gas House." The cost of piping the houses may well prove a wise expenditure.

Another point to be remembered is that in many cases gas services to ordinary consumers are laid free of charge, and gas cookers supplied on hire without charge for fixing, even where gas is not used for lighting; and it has in the past been considered worth while to secure this class of consumer. Is the return obtained from the gas consumption in these cases any greater on the capital expended than from a slot consumer on a new housing estate?

The general policy of hiring apparatus does not come under this section of the distribution problems of to-day; but it is a vital one, and should call forth a very valuable discussion. I do not propose to deal with it here, and will close these notes with the suggestion that the main and only real difficulty in dealing with gas supplies to housing estates is finding the necessary capital to carry out the work.

DISCUSSION.

The PRESIDENT said they had all been interested in Mr. Terrace's remarks. Everyone had housing schemes to contend with now, and it would be interesting to know what they had been doing.

Mr. P. J. KENDALL (Halesworth) said in the case of one works he was connected with they had a scheme under which 120 houses were to be put up. When he was approached with a view to putting gas in, a difficulty arose about piping. Fortunately, they had a main finishing where the houses commenced; and he went into the matter with the surveyor and architect, and had arranged that the Council should pay the cost of fitting-up the houses and installing lights and a cooker in each, while he was laying services to the houses free. He did not think that any would be more than 30 ft. The Council had agreed to purchase all the fittings from the Company, including a cooker or ring, as the case might be, and a griller, and let the houses be fitted-up complete ready for the consumer to come in. Most of the houses now being erected were taking the place of others that had been condemned, where there was not gas, and was not likely to be, because if they started to put in gas the houses would come down. They would get as consumers all the people who moved from these condemned houses into the new ones. They had an estimate for putting in four electric lights; and the charge for this, but not supplying lamps, was £7 13s. His Company's charge was £9 15s., not including the cooker.

Mr. PATERNOSTER said that in a small housing scheme at Felixstowe it had been decided to use "all gas." The Local Council were very anxious to instal electricity and gas for cooking only; but they were told by the Housing Commissioners that they must have one or the other, and they decided upon gas. They came to him for a quotation for laying services and fitting-up each house complete. They gave an estimate of £9 per house, including service. A few of these houses had just been completed. They consisted of two living rooms, kitchen, three bedrooms, and a bath room. The services to these houses, which came from existing mains, averaged 80 ft. of piping. They supplied points for the cooker, for a bracket in the kitchen, for a pendant in the living room, for a pendant in the parlour, for a bracket in each bedroom and the bathroom, for a geyser in the bathroom, and for a gas-fire in one room. Pipes were arranged so that a gas-boiler could easily be fixed in the kitchen, and fires elsewhere. The gas-cooker was to be hired or purchased from the Company; and the other fittings were to be purchased by the tenant. The size of the pipes was ¾ in. for the cooker and geyser, ½ in. for fires, and ⅜ in. for all other supplies, with ¼ in. drops. Services would be ¾ in.

Mr. G. A. MALLETT (Ipswich) said that, in connection with a housing scheme for over a thousand houses, his Company had put in such a price for "all gas" that if the authority did not accept it they would be spending thousands of pounds of the ratepayers' money needlessly. But he was afraid that, in spite of this offer—in fact, he had heard it said unofficially—the Committee would go in for electricity at all costs. This was the sort of thing they were up-against; but in face of opposition of this character one did not feel much disposed to share the cost of putting in the gas supplies they must have. If the Committee could throw away their money upon electricity, let them, as far as possible, pay the actual cost of the gas supply. This was how he felt. The Company would have to lay miles of mains to these places. They had gone into the matter most carefully. Mr. Prentice had a very nice idea of how he was going to deal with it; and the whole lay-out was well-planned. They did not ask them to pay the initial cost

of the mains, or such a proportion as they could do under their statutory powers; but, in spite of this, the authority were wedded to electricity. A thing like this was unfair competition; and he was bound to say most of them were up-against the same thing, at least in fair-sized towns. These houses were of what was known as the "parlour" type—he supposed this meant best room, living room, kitchen, and three bedrooms—and he believed they were going to spend £20 on each house for electricity; while his Company could put in gas for all purposes, including fittings and burners and a supply for a geyser, and instal a cooker and everything else, at less than this figure. He did not know where business was going to on these lines. If only they could, by some means, make the Committee realize that they were only custodians of the ratepayers' money, and that, even if they had an electricity undertaking, it was their duty to make it pay, and not to incur further capital expenditure, on which the Gas Company would have to pay, as ratepayers, interest for very many years, and see precious little return for it.

Mr. F. A. WEST (Newark) said his case was quite opposite to that of the last speaker. The Housing Commissioners were practically begging for gas to be laid on—not electricity. But the question arose of laying mains to the houses. At the present moment, only about 150 houses were going up, with an ultimate prospect of 1000. The Gas Company had asked the Housing Commissioners, and not the ratepayers, as it should not come out of the ratepayers' money, to guarantee them a reasonable return or interest on the capital expenditure on the laying of mains; and the Commissioners had practically agreed to this.

The PRESIDENT: For how long?

Mr. WEST: Until such time as the whole scheme is a paying proposition; until the consumption of gas on these mains will warrant the outlay. This guarantee will vary according to the consumption. He added that the houses were fitted according to the Gas Company's specification, and under their supervision. The Gas Company would hire, sell, or let on hire-purchase apparatus as required. Points were left for gas-fires, cookers, and hot-water apparatus in every house.

Mr. H. R. WIMHURST (Bury St. Edmunds) said that his experience had been similar to that of Mr. Mallett. In drawing-up their housing scheme, the Council thought that gas was retrograde, and would never be required; but as the scheme advanced, it was found there was likely to be a demand for gas in these houses, and his Company were approached with a view to laying mains before the streets were made up. The Company naturally asked what facilities the Council were giving the tenants to consume gas, in order to make the thing a commercial proposition to the Company; and they were calmly told if the tenants wanted gas they would have to apply to the Company, and have it laid on at their own expense. This was not good enough for the Company; but negotiations were going on, and he thought they proposed to scrap the kitchen range and hot-water system and pipe the houses and provide a cooker and wash-boiler. Upon these terms, the Company had stated that they would be willing to lay the main, as they thought they could anticipate a reasonable return on the outlay. Like Mr. Mallett, he found that local authorities were doing their utmost to boost the interests of their own electricity undertaking, and that the gas undertaking in a good many cases was being left in the lurch.

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(6)

Mr. E. F. KEABLE, of Gorleston,

ON

SHOWROOM ARRANGEMENT AND PRACTICE.

Showrooms have now become recognized as essential to progressive gas undertakings. When I entered the gas industry seventeen years ago, this was by no means the case; for having spent the first six years of my business life in the world of keen competition, I am bound to say that I was shocked to find the "Take it or leave it" spirit which then existed. Happily I have seen this spirit pass swiftly into the background; and I have never failed to hit it hard blows whenever opportunity presented itself. I have for a long time past been waiting an opportunity to put my own ideas of the matter into practice, and am glad to say I am now engaged upon a scheme a brief description of which will illustrate my aims, and I hope open up a free discussion.

By rearranging a piece of works apparatus, I was able to secure a substantial building, standing with its entire front to main road, having a floor area of about 700 sq. ft. Fortunately, on one side it adjoined the rental offices. Having had the pleasure and profit of seeing many of the best showrooms in the country, my problem was how I could as far as possible make the building at my disposal fulfil my aims within the means I possessed. Finally, I decided upon a scheme embodying the following points: 1. A model kitchen. 2. A shopfront (formed by a large showcase). 3. A bathroom. 4. An office. 5. A hall. 6. A drawing room. 7. A dining room. 8. A bedroom. Also a general display, including a slot-meter exhibit and a telephone box for consumers' use.

The showroom window will only be sufficient to give a small display, and thereby it is hoped to create a desire to step inside to see more. The main entrance will be at the farthest corner from the rental offices, the idea of which is obvious. The furnishing firms of the town will be invited to loan suitable pieces of furniture for short periods for use in rooms. As far as possible every piece of gas apparatus in the exhibit will be usable, and as nearly as possible under the same conditions as would be the case in a consumer's house or premises. I think we are all agreed that a prospective consumer is not impressed by "cold iron," &c.; but, on the other hand, a piece of apparatus which can be lighted and used in position will readily sell itself.

In a separate room, every piece of apparatus will be tested for consumption and efficiency, so that we are able to offer reliable data to intending purchasers. In another part of the building will be provided a few small compartments, each of equal capacity but papered in different colours, with the object of demonstrating the comparative reflecting powers of different coloured wall papers, and also used for showing consumers the effect produced by any globe or shade before purchasing. In the testing room will be fixed ready for use a few small industrial appliances for the inspection of tradesmen, &c.

The division walls forming the various rooms, &c., will only be carried up about 10 ft.; and these will be formed of light framework upon which will be stretched canvas and then papered. This will enable frequent change of colour to be made possible by the use of distemper, thereby altering from time to time the general appearance. To my mind change in this particular is most important; for it is easily understood that consumers coming frequently to offices through showrooms may become so accustomed to one set-aspect that they fail to become attracted; and much as I envy some of the beautiful showrooms to be found, I fear that many arranged both inside and out with costly fittings of every description may become so familiar that they cease to exercise the value originally intended. Having once had a showroom fitted up on costly fixed lines, it is very difficult to bring about any real change. Nothing appeals more to ladies than change of colour; and if we are to retain permanent interest in our exhibits, we must do all in our power to cater along lines of known requirements.

We stand on a portion of the main road which at night is somewhat dark; and it will be our object to make this the brightest spot in the town.

We shall arrange to get in touch, through the Education Committee, with the senior girls attending the cookery centre, where cooking is done by gas, and let these pupils feel that our exhibit is a place where information on gas matters in general may be obtained freely, and when the scheme is going, to arrange a series of talks to those attending the centre, in order to make them not only more interested in gas in its many uses in domestic life, but to attempt to forge a lasting link between the cookery centre and the industry, which can and will be of vital help to the girls in their future—always remembering that in but a few years many of the pupils will become our valued consumers. In the case of the senior boys, much can be done along similar lines, by bringing to their direct notice apparatus and information which will be of real value to them in industry.

It is also our intention to keep all the outdoor staff in close touch with all appliances from the point of the test-room to the final exhibit, and thereby stimulate a keener interest, especially among the junior members, who will need all the training it is possible to give them if they are to rightly represent our great industry in the near future. Our permanent maintenance staff will make the exhibit their centre and, while attending to their requirements, be the means of inviting consumers to pay us a visit. As soon as possible we hope to arrange for a capable lady to instruct consumers in the full use of their gas cookers, over at least a portion of each year. I think we are all agreed that much work in this direction is necessary, especially when economy is so urgently required.

In concluding these remarks, I would suggest that we should rename our showrooms "Permanent Gas Exhibits and Educational Centres." I feel certain new life would come into such departments, for they would be raised from what is sometimes a glorified stock room to a real live centre of gas in its manifold uses.

I would go so far as to say that, where a suitable building is not available, a house whenever possible should be fitted up somewhat along the lines I have indicated.

In the past it has been our custom to collect all ordinary meter gas accounts at consumers' houses; but for some months past this has been discontinued—the reason being that we were anxious to train as many as possible of our consumers to pay their accounts at the office. When our scheme is complete, we hope to bring a large percentage of consumers through our exhibit each quarter; and for this reason, as already stated, the only entrance to the offices will be at the farthest corner of the exhibit.

Many of my remarks are, I am aware, common-place; but I trust at this juncture they will bear repeating.

DISCUSSION.

Mr. F. H. HOLLAND (British Commercial Gas Association) expressed his appreciation of the invitation to be present, and said that, of course, most of the subjects that had been discussed interested him. They interested him from rather a different point of view. Labour in particular interested him as much as it interested other branches. Mr. Prentice had said that he would rather spend £1000 or £1500 than employ another man. His department was offering the industry new methods and principles which were reducing labour costs all over the country. For two years now they had been considering labour in the industry, particularly fitting labour; and though this might not have much to do with show-rooms, yet it had a practical application. In the ordinary course of his duties, he attended about seventy gas undertakings, north, south, east, and west, and visited a number of show-rooms; and it seemed to him that, though the undertakings gave a good deal of consideration in some places to the arrangement of the show-room—the beautification of the place—they did not give quite sufficient attention to the people they employed in them. He was thinking, of course, of specific cases; and, though he might congratulate the last speaker on his happy arrangement, he did frankly and honestly recommend him to give special attention to the people he placed in the show-room. It was his (Mr. Holland's) experience that the average show-room attendant did not produce the best results, simply because he was not quite of the type that should be employed. With regard to changing show-rooms periodically, he

was very glad to hear this point emphasized. One of the finest show-rooms he knew—and it should be nameless—had been suffering losses of revenue which were directly attributable to the permanence of the exhibit. It had been in the same condition for four years. Changes had recently been made; and there had been a 28 p.ct. improvement. This was very material. The average show-room—they must please forgive him for saying it—was a deplorable place. One heard an electrical engineer or electrical supplier boast that he was an electrician; but he had never heard a man boast of being a gas engineer, and he travelled a good deal. Was it because some of them, at the bottom of their hearts, deplored public opinion of gas? This public opinion was directly due to the nondescript show-rooms that they put up for the public to look at. He could take them to places where there were no show-rooms at all, to begin with—where the works were on the outskirts of the town, and nothing was known about gas. Inevitably, low average consumptions were deplored. Mr. Glover would forgive him for saying that the industry must face this issue. Supposing they had unprofitable gas consumption, why was it? It was obviously due to one of two things—(1) they did not give sufficient opportunity for consumption, or (2) they did not look after the consumers after they had become consumers and so obtain most use. He was afraid he was taking up time; but he would like to point out one thing with regard to automatic consumers—namely, that the industry needed to change its standards. What used to be an automatic gas consumer was no longer so. He could take them to a place where an experiment had been tried of 124 "ordinary automatic" consumers. The houses were six-roomed. The automatic consumption was just over 11,000 c.ft. per house when the experiment was commenced. The same terms were offered to these automatic consumers as to ordinary consumers. In eleven months, these consumptions had increased from 11,000 to 32,000 c.ft. Did they not think, in looking at automatic consumers, they needed in these days to have regard to purchasing power. Purchasing power had altered. Certain classes of labour were receiving higher rates than other classes. They should classify their areas—get down to the unit in each class, concentrate their efforts, make up their minds exactly what they wished to sell, and go in and sell it. They should improve the efficiency of their show-rooms, and improve the efficiency of their show-room attendants. They should place as much importance on the selling of gas as on the making of gas (it was just as much a science), and then they would not have any need to fear electrical competition.

CASE-HARDENING WITH GAS.

A comparatively new development in connection with the case-hardening of steel, in which town gas is employed with considerable success, has been described by Mr. H. M. Crawford in the American "Gas Age." The apparatus consists of a steel cylinder, 18 in. diameter and 24 in. long, entirely enclosed in a furnace provided with the necessary number of burners. The cylinder has a gas-proof cover on top, and openings to admit and exhaust town gas. Thus gas is used in two ways—first, to produce the necessary temperature in the furnace; and, secondly, it is passed through the cylinder filled with steel parts. The gas is simply allowed to come into contact with the steel. It reaches 1700° Fahr.; but as no air is admitted, it is not consumed, and is afterwards expelled from the cylinder and burned at the point of exhaust as an illuminating flame, or it may be passed into the furnace for consumption through separate burners. In using the gas-furnace mentioned, it is only necessary to employ a pyrometer which can be inserted in the gas cylinder, thus recording the actual temperature of the work at all times. Under actual operating conditions, the furnace can be kept around 1700° Fahr. for several hours, providing an almost perfect carbonizing condition. Steel pins at 1700° Fahr. for two hours, using 80 c.ft. of gas per hour in the cylinder, have shown 1-32nd in. depth of carbon penetration. One difficulty with case-hardening has been the tendency to crack the core, or separate it from the outer case produced. The use of gas gives perfect diffusion, by soaking the material after the carbonizing gas has been turned off—that is, the steel is subjected to heat, but not to further gas. Almost any penetration can be made, depending upon the temperature employed, and the amount of gas used in the cylinder. The best practical results seem to be obtained when just enough gas is admitted into the cylinder to produce a light deposit of free carbon on the metal being treated. No scale has been noticed on any work. In fact, gas is found to possess many advantages, among which it results in a great saving of time and labour. Since the introduction of gas carbonizing, a number of manufacturers on the Pacific Coast have adopted it.

Alcohol and the Price of Motor Fuel.—It is understood by "The Times" that the Sub-Committee that was appointed to investigate the cost and profit of motor fuel have met to consider finally their draft report. It was, however, decided to hold it over until an opportunity had been afforded to the representatives of the oil combines to justify the recent increase of 7d. per gallon on petrol, to which, it is believed, the draft report took strong exception. It was also decided to ask Sir George Beilby (the Chairman of the Fuel Research Committee) to report as to the progress made in the direction of discovering a denaturant of power alcohol, to the use of which the attitude of the Excise authorities is now much more favourable. Experiments have also been made with other substitutes for petrol by Sir George and the Committee over which he presides.

CORRESPONDENCE.

[We are not responsible for opinions expressed by Correspondents.]

The "Betrayal" of the Gas Shareholder.

Sir,—Mr. Read in your issue of the 6th inst. certainly puts forward some novel ideas; and he persistently ignores the 87½ p.ct. perpetual excess profits duty attached to gas ordinary. However, time will prove who is right; and I certainly hope it will be Mr. Read. But he ought to be aware that South Metropolitan ordinary stock is at its present price on its prospects of paying 5 p.ct. in future, and not on the basis of its last dividend.

It is instructive to note how Mr. Read confuses "gas ordinary" with "gilt-edged" stock. No doubt he made the same mistake when he paid 113 for consols. A real "gilt-edged" stock now is one that has to be redeemed at a certain price on a certain date. Gas ordinary certainly does not come in this category.

My name would not carry any weight with Mr. Read. I am not at liberty to publish it, as I do not speak only for myself, as explained in my first letter.

"One of the Betrayed."

Oct. 8, 1920.

"N.B.C." Lubricant Prices.

Sir,—I regret that, owing to an oversight, the price at which supplies of "N.B.C." lubricants are obtainable in small quantities from garages was wrongly stated. The price should read 8s. 3d., and not 9s. 9d. per gallon, as appeared in our last advertisement.

Would you be good enough to publish this correction?

P. G. Somerville, Asst. General Manager,
National Benzole Company, Ltd.

30, *Grosvenor Gardens, S.W.* 1,
Oct. 8, 1920.

REGISTER OF PATENTS.

APPLICATIONS FOR PATENTS.

[Extracted from the "Official List" for Oct. 6.]

Nos. 27,381—28,017.

Anderson, H. P. H.—"Gas-producer." No. 27,385.
Aymard, M. F. L. A.—"Gas-fuel containers for motor-vehicles." No. 28,006.
Bapty, S. L.—"Gas-burners." No. 27,489.
Barnitt, H. D.—"Pipe joints." No. 27,724.
Blake, S. W.—"Manufacture of fuel for heat, light, and power." No. 27,811.
Debaisieux, E. L.—"Gas stoves." No. 27,483.
Ditchfield, R. B.—"Ascertaining condition of burners of gas cooking-stoves, &c." No. 27,995.
Glover, S.—"Separation of liquor from tar and oils." No. 27,999.
Glover, W. R.—"Coin-freed gas-meters." No. 27,989.
Goodyear Tire & Rubber Company.—"Gas valves." Nos. 27,671, 27,785, 27,926.
Goskar, T. A.—"Drying coal, &c." No. 27,881.
Goss, E. O.—See Blake, S. W. No. 27,811.
Güttner, M.—"Rotary blower and gas compressor." Nos. 28,009, 28,010.
Jackson, F. L.—"Pipe joints." No. 27,724.
King, F. H. W.—"Coin-freed gas-meters." No. 27,383.
Knight, J.—"Gas-oven for biscuit baking, &c." No. 27,841.
Lewis, G. P.—"Distillation and gasification of solid carbonaceous matter." No. 27,910.
Maconochie, H.—"Gas-producer." No. 27,385.
Norsk Hydro Elektrisk Kvælstofaktieselskab.—"Catalyzer for manufacture of ammonia." No. 27,491.
Rabbetts, F.—"Gas-cooker." No. 27,387.
Robinson, F. H.—"Mixed-gas plant." No. 27,966.
Sutherland Meter Company.—"Coin-freed gas-meters." No. 27,383.
Wallace, G. W.—"Process for distilling carbonaceous material." No. 27,798.
Wallace, G. W.—"Apparatus for distilling carbonaceous material." No. 27,799.
West, J., and West's Gas Improvement Company.—See Glover, S. No. 27,999.
Whimster, J. I.—"Coin-freed gas-meters." No. 27,989.

Public Lighting of Paris.—In a message dated Friday, the correspondent of "The Times" said that Paris was that night to have the increased illumination which it had been promised. Owing to the need for the saving of coal, the city has been a city of gloom once the main streets were left behind. Coal stocks are now considered sufficient to warrant a night aspect of rather more gaiety, and so an extra 14,000 gas-lamps will be put into commission again. In addition, 1500 electric lamps will be installed on boulevards and main streets.

A Pretended Meter Inspector.—Fred Wedlock, a native of Birmingham and an ex-soldier, pleaded guilty at Leeds to being on enclosed premises for an unlawful purpose. He had represented himself to be a gas-meter inspector, in order to get into houses. When accosted by the police, he said he had no credentials, but that he had been sent from Swansea with fifty other men to examine gas-meters in consequence of the threatened strike. He was arrested, and proved to be unable to read a gas-meter. He was discharged under the Probation of Offenders' Act.

MISCELLANEOUS NEWS.

METROPOLITAN GAS COMPANY OF MELBOURNE.

The report and balance-sheet for the half year ended June 30 were submitted to the proprietors at the meeting in Melbourne on July 28.

Sir JOHN GRICE (the Chairman), who presided, expressed regret that the statement was not more satisfactory. He said that, for the first time for many years they were unable to transfer anything either to the reserve fund or to the gas-stoves or meter-renewal account (which were really provisions for depreciation); and in order to pay the dividend it had been necessary to encroach upon the carry-forward. To show the depletion of these reserves, it might be mentioned that the balance to the credit of the reserve fund account was only £3400, as contrasted with £34,400 twelve months ago; and the meter-renewal fund had been reduced from £5000 a year ago to £400. The operations of the Company had been seriously affected by disturbed industrial conditions and the consequences arising therefrom. Over 25,000 tons of coal were despatched by rail from Newcastle, at an increased cost of over 25s. per ton; and, in order to partially reimburse the Company, an extra charge per 1000 c.ft. was made to consumers during the months of April, May, and June. But there was nothing to compensate the Company for the great loss in the volume of business, and for the loss of profits by the reduction in the bye-products caused by the smaller output of gas.

With the settlement of the marine engineers' strike and the resumption of interstate shipping, great effort was made to build-up the coal stocks, which were at a very low ebb. Success attended the effort for a time; and in the middle of May the total quantity of coal stored had reached a figure of over 30,000 tons. Unfortunately, however, a break then occurred in the imports; and this, together with the larger quantity of coal being carbonized owing to the approach of winter, rapidly reduced the stocks, until in the first week of June approximately 16,000 tons only were held; which represented barely sufficient for three weeks' normal output. They were then faced with the strike of gas-workers. As a result of the gas-workers' strike in December, 1919, and of a conference between the parties presided over by the Premier, employees of the Company were granted various increases; an agreement being subsequently entered into. This agreement provided that no further demands would be made before April 30, 1920; and that at that date, or so soon thereafter as possible, the Union would follow constitutional methods by applying to the Court or other properly and legally constituted authority for a fresh award, and would abide by the decision. In April last the Union requested the Companies to meet them in conference to discuss hours and working conditions, and to also make a definite offer of increased wages to date from May 1.

Following upon this a comprehensive statement was served upon the Companies, containing demands based upon a minimum rate for unskilled labour of £7 per week, with a week of 40 hours, and up to £9 1s. per week for stokers for a week of 36 hours. On June 8, a Compulsory Conference was convened by Mr. Justice Higgins, and resumed on the following day, when the Companies agreed to certain increases, the lowest paid stokers being offered 15s. 6d. per day. These rates were to be maintained until the Arbitration Court had heard the case and made its award. The offers were, it is understood, placed before a mass meeting of men held on the night of June 10, when they were rejected, and a resolution passed deciding to cease work at 11 o'clock next morning, unless the Companies paid a basic wage of 14s. per day. The men carried out their threat.

It was to be regretted that the sudden cessation of work on June 11 was attended by considerable damage to the Company's plant; the carbonizing plant at West Melbourne especially being subjected to great strain. The intermittent vertical carbonizing system (known as the Dessau plant) was put out of action; and, as a consequence, it is extremely unlikely that the whole plant will ever be in a condition to be worked again. Some portion might be re-employed; but this was very doubtful. The inclined retort carbonizing plant at West Melbourne also suffered considerably; and, as a direct consequence of the strike, about half of it would have to be repaired before it could be efficiently used. Shortly summarized, the Company's offer to the men prior to the strike, and the terms finally accepted by the Union, were as follows:

Offers made to Union prior to Strike.	*Terms Finally Accepted by Union.*
One shilling per day increase to all adult members of the Federated Gas Employees' Industrial Union (making the basic wage 13s.) as from May 1, 1920.	Accepted.
20 p.ct. increase on certain secondary wages.	Accepted.
Weekly wage, subject to regulations.	Accepted
Retrospective rates on final award over 13s. (so far as Judge thought just) to May 1, 1920.	Withdrawn by Companies and not reinstated; but, in place of this, quarterly revision on Statistician's figures. First revision as from Oct. 1, 1920, on previous twelve months' figures. Such revisions to have effect until date of award only.
NOTE.—This offer not made until the day following upon the strike—viz., June 12, 1920.	

Numbers of men gave up the whole of their time, and willingly rendered conspicuous service in performing new and strange duties at the manufacturing stations, as well as helping to transport the volunteers in motors to the works.

The thanks of the Board were also due to the members of the clerical and distribution staffs of the Company who volunteered their services in any capacity during the strike. Full advantage was taken of the offers of assistance thus received; and a large number of these employees were drafted into the works, where they did excellent service. The support thus received made it possible to maintain a limited supply of gas to the public of Melbourne, and enabled the Company to make a strong effort to secure the definite establishment of constitutional methods in the settlement of industrial disputes.

The sales of gas for the half year amounted to 1655 million c.ft., as compared with 1765 million c.ft. for the corresponding period of last year—a decrease of about 6½ per cent.

A further misfortune with which the Company had had to contend during the period under review was the collapse on April 4 last of the 3 million c.ft. gasholder situated at the South Melbourne works. A Board, consisting of Prof. D. Orme Masson, M.A., D.Sc. (Professor of Chemistry at the Melbourne University), and Mr. B. A. Smith, M.C.E., were appointed "to inquire into, and if possible, to determine the cause [of the bursting and wrecking . . . of the gasholder . . . and in due course to report the result of the inquiry, with the opinion of the members." Several sittings of the Board had been held; but the evidence so far of eye-witnesses and experts had failed to disclose the cause of the accident. These sittings of the Board had been adjourned to enable the holder to be completely dismantled and the materials closely examined; but, unfortunately the work of demolition had been suspended owing to the employees going out on strike.

During the half year under review the second Woodall-Duckham installation at the West Melbourne works was put into operation; and progress was being made towards completion of the third installation of this system. The steel work and machinery for the Woodall-Duckham coal handling plant was in course of construction; and the new purifier house, which was completed in the summer, would now have been in operation but for the strike. The destroyed portions of the gasholder which collapsed were being removed; and all the materials for its early reconstruction were on order.

The report and balance-sheet were adopted, and a dividend was declared of 6s. 6d. per share for the half year.

ECHO OF THE CHELTENHAM GAS STRIKE.

Letter from the Board of Trade.

The Town Clerk announced, at a meeting of the Cheltenham Town Council on the 4th inst., in reference to the recent strike of gas workers, that a communication had been received from the Board of Trade, who said their attention had been drawn to a report in the "JOURNAL" of a discussion which took place at a meeting of the Cheltenham Town Council, in which it appeared to have been suggested that to some extent the responsibility for the recent strike of gas workers rested with the Board of Trade, on account of their alleged delay in dealing with the application by the Company for power to increase the price of gas. The writer (Mr. H. J. Carlill) proceeded:

> The Board desire me, therefore, to state that they informed the Cheltenham Gas Company in March last that, if they wished to apply for a Temporary Increase of Charges Order, they would be prepared to consider the application. On July 16, the Company made an application for an Order to increase their maximum price from 4s. to 6s. per 1000 c.ft., and served the necessary notices upon the local authorities concerned. On Aug. 7, the Company stated that there appeared to be no objection lodged that required an answer, and suggested that, if an interview with the Company's representative was required, it should be arranged for some date after Aug. 12. An interview was not found necessary; and on Aug. 13 the Board wrote to the Company saying that they would be prepared to make an Order fixing a temporary maximum price of 5s. 6d., and limiting the dividend to 3½ p.ct. as required by the Act.
>
> On Aug. 16 the Company asked that the granting of the Order might be deferred until after a meeting of the Directors; and on Aug. 23 they wrote informing the Board of Trade that it would be necessary to raise the price of gas to 5s. 6d. at once, and again asking that a maximum of 6s. might be allowed. On Aug. 25 the Board of Trade made an Order authorizing a price of 5s. 6d., and informed the Company by telegram.

There was no comment made at the Council meeting.

LEAMINGTON PRIORS GAS COMPANY.

Presiding over the 111th ordinary meeting of the Company, Dr T. W. Thursfield, J.P. (the Chairman) said the carry-forward had been reduced during the year by nearly £2500, or more than the amount required to pay the half-year's dividend; and this process could not continue indefinitely. Throughout the country the price of gas had not increased to anything like the extent of other commodities; and the Leamington price (4s. per 1000 c.ft.) was a very low one.

Until just recently gas undertakings near the coast had been exporting coke to Sweden for iron smelting at most remarkable prices—up to £10 and £12 a ton having been received. This had enabled reductions to be made in the price of gas; and the Leamington Gas Company had done their utmost to get some surplus coke exported, after having satisfied the needs of all their local and regular customers. The ways of Government Departments, however, passed comprehension; and up to the present they had absolutely refused to let them send a ton of coke away for export. The reason given was that the rolling stock could not be spared for the long journey to the coast. But a large proportion of coal was delivered in merchants' private wagons, which went back empty to collieries in Yorkshire; and the owners were anxious for them to be sent out loaded with coke. They would, in the interests of Leamington gas consumers and their shareholders, continue to press this matter, as soon as permits were granted to export

any coke at all. With regard to their coal supplies, he was pleased to be able to say that during the past few months deliveries had improved very much in quantity; and he took the opportunity of thanking all their contractors and the District Coal Supplies Committees responsible for this state of affairs.

The regular increases in the output of gas month by month and the increasing sales of gas appliances of all kinds from their show-rooms were all good signs for the future. Gas was being adopted for lighting and cooking in the Corporation's new houses in Leicester Street and Tachbrook Road; and they were very desirous that the tenants should also have the opportunity of realizing the benefits of gas-heated washing coppers and gas-fires in the parlours and bedrooms. These should be fixed instead of, and not in addition to, bricked-in coppers and ordinary fire-grates, so as to obviate unnecessary expense; and if the flues of the gas-fires were built in the thickness of the walls, considerable saving could be effected by doing away with chimney breasts, &c.

At the moment he believed the majority of gas-workers throughout the country were fairly contented with their lot. At any rate, their own workmen were carrying out their duties most satisfactorily; and he hoped that, in spite of the strike notice sent in on their behalf in June (which had been a very great disappointment), their men felt the Company were treating them fairly. It was certainly their intention to do so; and he wanted the workmen shareholders to use their influence with their fellow workers to strengthen the ties of friendship between the proprietors and employees of the Company which were so essential to comfortable and successful working for them all.

The report and accounts were adopted.

RADIATION, LTD., AND PRICES OF APPARATUS.

An Anticipated Advance not to be Made.

The firms constituting Radiation, Ltd.—*i.e.*, Messrs. Arden Hill & Co., Davis Gas-Stove Co., Fletcher, Russell, & Co., Richmond Gas Stove and Meter Co., and John Wright & Co.—announce that they have been very carefully considering for some time past the question of the further advance in prices of their apparatus, which it was intimated in a circular of May 18 last would probably have to be made in August.

Since the circular was sent out there have been a great increase in railway rates and general increases given to labour, with consequent rises in the prices of materials; and further increases are demanded. On the other hand, the firms named have realized what a serious matter further advances are to gas undertakings; and they have therefore decided that, though on present-day costs certain of their manufactures show an actual loss at current selling prices, the advance which was proposed for August last will not now be made.

The firms promise an early announcement as to their policy in regard to manufacture and developments, which they believe will be of vital interest and advantage to gas undertakings generally.

THE COKE-HEAP FIRE AT BECKTON.

The following interesting account of the fight with the coke-heap fire recently at the Beckton Gas-Works is taken from the October issue of the Gas Light and Coke Company's "Co-Partners' Magazine."

A very serious outbreak of fire occurred on Sunday evening, Aug. 29, in the main coke-heap at Beckton. This heap is situated in an outlying position on the Marsh, and is approximately 1500 ft. long, 150 ft. wide, and 30 ft. high (at the seat of the fire). The first signs of fire were hot fumes and steam issuing from a small patch on the top surface, approximately at the centre of the heap longitudinally, and about 35 ft. from the skirt. Mr. Warren, the Assistant Engineer on duty, got together a gang of the men available, and cut a small trench round the fire. Water was then used, and the fire apparently extinguished. The digging-out was continued all night.

The following day, however, the presence of fire was still evident, and the coke foreman, Mr. Drake, arranged for a crane and grab to be brought up to remove the apparent pocket of fire. Grabbing proceeded throughout the day; and it was found that the area of fire was considerable, and low down in the heap. Accordingly, the crane gang and firemen were kept at work throughout the night. Water was only used at this period for quenching the hot coke removed, as its use in a crater of fire forms water gas, which spreads and fires in all directions through the surrounding coke. On Tuesday morning it was obviously useless to extend the crater further; and it was decided to isolate this crater of fire by a cutting from two points on the nearest side of the bank, extending in a semicircle round the fire. For this purpose a second crane and grab were brought on to the top of the heap, and these operations started. Simultaneously the transfer of the railroad from a neighbouring coal heap was commenced, in order that cranes with grabs might be brought in to work from the ground level from the same two points as the cranes on the top. Very satisfactory progress was made by the two cranes working night and day; and these cranes met, thus completing the semicircle round the crater by Thursday midday. The fire at this time appeared to be well under control, and numerous test rods driven down the full depth on the fire side of the cutting were quite cold when withdrawn.

Up to this point, until the danger area of the fire could be limited by this cutting, the use of water had been carefully controlled to avoid the formation of water gas, which, with the changeable easterly wind, would have been driven into the unaffected portion of the coke. Meanwhile, a new 4-in. water service from high pressure pumps, over 1000 ft. in length, was laid in twelve hours, with fire hose outlets. At the same time the Beckton steam fire-engine was working. On Thursday night, with the freshening of the wind, serious developments took place. From 8 p.m. until midnight, the sides of the inner crater constantly collapsed inwards, and the protecting wall of coke, which appeared ample and perfectly safe earlier in the day, was rapidly reduced; and the fire by Friday morning reached the cutting.

Drastic measures to save the greater portion of the coke heap had to be immediately taken. It was decided to make a safety cutting through the upper and larger portion of the heap, about 130 ft. beyond the upper cutting already in progress. For this purpose both top cranes were moved into the new position. This was a laborious proceeding, involving constant work of platelayers and crane drivers throughout the remainder of Friday and the night. At the same time, a further crane had to be brought into position to continue the lower cutting across the heap. The heap at this point was considerably narrower; and there appeared to be a good chance of completing the cutting without further retreat. This cutting was eventually completed to ground level successfully by the cranes on the top after a great struggle in steam and fumes. The fire being partly isolated, it was considered advisable to put a water barrage on the remaining neck. The assistance of the London Fire Brigade was obtained (the coke heap being just within the London area). Three L.F.B. motor engines were sent, followed by four others; in addition, a steam-engine was hired from Merryweather's, and two further L.F.B. engines were sent on Sunday—making a total of eleven engines.

The position on Tuesday evening, Sept. 7, was that the lower end was completely isolated, a railroad had been transferred from it, and the top crane moved by this means on to the marsh, where it was in position on a new road laid with the assistance of the Great Eastern Railway platelayers, and had commenced grabbing it immediately behind the water barrage. These cranes eventually joined-up with the ground crane on the opposite side of the heap, working in the original cutting on the upper one—thus salving the whole of the coke between this point and the safety cutting. With the more favourable wind prevailing during the later 24 hours, the gases generated by the water on the burning coke were driven harmless, enabling the water barrage to be advanced some 10 ft. towards the fire.

The whole of the staff was organized when the fire was found to be serious, to provide supervision throughout the 24 hours, at the same time carrying on as far as possible their regular duties. Naturally, the labour of dealing with such a formidable outbreak of fire has been arduous, and the task of the engineering staff exacting to a degree. It is a matter of thankfulness that not the smallest mishap or personal injury was experienced throughout the protracted period during which the mass of coke continued to burn.

CURRENT SALES OF GAS PRODUCTS.

The London Market for Tar, Tar Products, and Sulphate.

LONDON, *Oct.* 11.

All the tar products in the London market maintain their firm position; the price for pitch being at not less than 220s. per ton f.o.b. makers' works. There is considerable inquiry for both home and export. Creosote continues firm at about 1s. 4d. net per gallon; all other products remaining at the prices previously quoted.

The sulphate of ammonia position for the home trade is unaltered. The October price for 24¾ p.ct. is £25 3s. 6d. per ton to farmers, with the usual allowance of 10s. per ton to dealers.

Tar Products in the Provinces.

Oct. 11.

The average values for gas-works' products during the week were: Gas-works coal tar, 127s. 6d. to 132s. 6d. Pitch, East Coast, 217s. 6d. to 220s. per ton f.a.s.; West Coast—Manchester, 195s. to 205s.; Liverpool, 195s. to 205s.; Clyde, 200s. to 210s. nominal. Benzole 90 p.ct. North, 3s. 1d. to 3s. 2d.; crude 65 p.ct. at 120° C., 2s. 3d. to 2s. 5d. naked at makers' works; 50-90 p.ct. naked, North, 3s. 2d. to 3s. 3d. Toluol, naked, North, 3s. 1½d. to 3s. 2½d. nominal. Coal tar crude naphtha in bulk, North, 1s. 2d. to 1s. 3d. Solvent naphtha, naked, North, 3s. to 3s. 2d. Heavy naphtha, North, 3s. 1d. to 3s. 3d. Creosote, in bulk, North, liquid, 1s. 0¾d. to 1s. 1¾d.; salty, 1s. to 1s. 1d. Heavy oils, in bulk, North, 1s. 1d. to 1s. 2d. Carbolic acid, 60 p.ct., 3s. 3d. to 3s. 6d. Naphthalene, £37 10s. to £40; salts, £10 to £10 10s., bags included. Anthracene, "A" quality, 1s. per minimum 40 p.ct.; "B" quality, nominal.

Manchester District Tar Prices.

The average price realized for the sale of tar, according to the sliding-scale, during the month of August, was £8 3s. 2·22d.

FROM A MARKET CORRESPONDENT.

Tar Products.

There is very little fresh to report. The influence of the coal dispute is still felt, and neither manufacturers nor consumers are willing to commit themselves far ahead. If the coal strike question were settled, it might be possible to form some opinion as to the future. But there must be at least another week of uncertainty, although it is generally hoped and believed that there will be no strike. Pitch remains at a high level. Very little business is being done, prices are almost nominal, and distillers are somewhat afraid to act on the assumption that pitch will remain saleable at £11. They are paying very high rates for tar; and if there should be a material fall in pitch values, they stand to lose heavily. Naphthalenes are a busy market; but there are reports from America that the market there is coming down. Whether this will eventually bring about a lower range of values here remains to be seen. Naphthas are uncertain. Heavy is without change; while sellers of solvent are asking for more money, though one does not hear that they are obtaining it. Cresylic acid is a dull market, and carbolics are in undecided condition. Creosote is

firm, and there has been no attempt to advance prices further. Benzole is scarce in the North, and apparently much difficulty is found in obtaining offers anywhere.

The range of quotations is as follows:

Benzole: 90% London 3s. 5d. to 3s. 7d., North 3s. 4d. to 3s. 6d.; 50-90% 2s. 8d. to 2s. 10d. London, 2s. 7d. to 2s. 9d. North; crude 60-65%, 1s. 7d. to 1s. 9d.; pure, 4s. per gallon naked.

Crude Tar: London, 105s. to 115s.; Midlands, 107s. 6d. to 117s. 6d.; North, 105s. to 115s. per ton *ex* works. Refined tar, 95s. per barrel (free) on rail.

Pitch: London, 225s. per ton f.o.b.; East Coast, 215s. per ton; West Coast, 215s., with Manchester 200s. per ton, and Glasgow 210s. per ton; South Wales, 222s. 6d. per ton.

Solvent Naphtha: London, 3s. 6d.; Provinces average 3s. 4d. per gallon.

Crude Naphtha: Naked, 10d.; North, 9d. per gallon.

Heavy Naphtha: 3s. 6d. per gallon.

Naphthalene: Refined flake, £60 per ton nominal; inferior, £35; crude, £18 to £35 per ton, according to quality.

Toluol: Naked, 2s. 11d. per gallon nominal. North, 2s. 9d. Pure, 4s.

Creosote: London, 1s. 2d. to 1s. 3½d.; North, 1s. 2½d.; heavy oil, 10½d. per gallon in bulk.

Anthracene: 40-45%, 9d. per unit per cwt.

Grease Oils: 18° Tw. (naked), £6 10s. per ton f.o.r. makers' works.

Pyridine: 20s. to 25s. per gallon.

Aniline Oil: 1s. 11d. per lb., drums extra.

Aniline Salts: 2s. 2d. per lb.

Cresylic Acid: 95%, 4s. 9d. to 5s. 3d.; 97-99%, 5s. 6d. to 5s. 9d. per gallon *ex* works London, f.o.b. other ports.

Carbolic Acid: Crude 60%, 3s. 4d. per gallon; crystals 40%, 10d. per lb. nominal.

Salicylic Acid: Technical, 2s. 7d.; B.P., 3s. 3d. per lb.

Xylol: Pure, 6s. 9d.; commercial, 5s. 9d. per gallon.

Sulphate of Ammonia.

Business is fair for the time of the year, though export trade is not so good as a few weeks ago. A feature of much interest in this market is the reduction in the price of sulphate of ammonia in France to 142 frs. per 100 kilos. in bulk at frontier stations, owing to regular deliveries by Germany under the Peace Treaty.

News from America is to the effect that producers are sold up for spot and near positions. Most business is being done through second hands, who seem to be in control of the market. After Japan threw back on this centre large quantities of sulphate, a brisk business developed in other directions, particularly Spain and the West Indies. This helped to maintain a steady position.

Dumbarton Gas-Works Report.—When the figures relating to the working of the gas undertaking for the year ended May 15 were submitted to the Dumbarton Town Council, Provost Buchanan said they had much reason to congratulate themselves and the Gas Manager (Mr. James Bell) on such a satisfactory report. From 9128 tons of coal there was produced 112 million c.ft. of gas, representing a yield of 12,270 c.ft. per ton. To meet the expenditure this year, it is necessary to increase the price of gas from 4s. to 4s. 6d. per 1000 c.ft.

New Carbonizing Plant for Stockton.—It was reported to the Stockton-on-Tees Town Council last week that the installation of new retorts would, it was estimated, cost £51,295; and it was agreed that application be made to the Ministry of Health for sanction to borrow £25,500 as capital expenditure, and to pay the remainder out of revenue. Subject to sanction being received, the tender of Messrs. Drakes Ltd., of Halifax, to provide retort-settings, stage-floors, continuous coal-storage hoppers, combined stoking machinery, &c., for eight through beds of retorts, 24 in. by 18 in. by 23 ft. long, for the sum of £37,390, was accepted. The Gas Manager (Mr. W. W. Atley) estimated the cost of the work which would be carried out by his department at approximately £13,905.

Reduced Charge at South Shields.—A letter was read at a meeting of the South Shields General Purposes Committee from the Secretary to the Gas Company, enclosing a notification that the price of gas throughout the Company's area of supply will be reduced 10d. per 1000 c.ft. from the date of the meter readings for June quarter last. The Town Clerk reported that the present selling price of gas to consumers in the inside area is 2s. 6d. per 1000 c.ft. A letter was also read intimating that the annual charges for public lighting in accordance with the existing agreement will be as follows: Full lighting single No. 3 Kern, £2 16s. per annum; full lighting double No. 3 Kern, £5 12s.; partial lighting single No. 3 Kern, £2 8s.; full lighting flat-flame burner, £2 18s. 6d. These rates are exclusive of any amounts for quarterly surcharges that may be made from time to time to cover the extra expense in relation to lighting repairing, and maintaining the public lamps, by reason of the present abnormal conditions.

Bridgwater Gas Light Company.—The Company have held their 86th annual meeting, when accounts were presented for the year ended June 30, which showed a profit of £3187. Final dividends were declared of 3⅜ p.ct. on the "A" stock, and 1⅝ p.ct. on the "B" and "C" stocks, leaving £1862 to be carried forward. The business of the Company continues to expand steadily; the consumption of gas for the year being 96,763,000 c.ft., or 13,383,600 c.ft. more than in the previous year. The Chairman (Mr. R. Y. Foley) expressed his deep regret, and that of the Directors and every stockholder, that through failing health, Mr. Cornish, senior, had not recently been able to render his advice and assistance at the Board meetings, and for the same reason could not be present that day. Mr. Cornish's connection with the Company extended to a period of over 60 years; and he believed during all this long time he had never missed an annual meeting. In proposing the re-election of Mr. J. Hughes Cornish as Secretary and Manager, he congratulated him and the staff at the works on the very large increase in business, and on the excellent carbonizing results obtained throughout the year.

Capital Powers at Aldershot.

Last Friday there was an extraordinary meeting of the proprietors of the Aldershot Gas, Water, and District Lighting Company, to authorize the raising of additional capital, especially having regard to the provisions of the Public Utility Companies (Capital Issues) Act. The Directors have decided to take immediate advantage of the powers thus afforded by offering for subscription an issue of £50,000 of 7 p.ct. mortgage bonds at par, redeemable on Jan. 1, 1931. The Chairman (Mr. R. W. Edwards) pointed out that since 1914, with the exception of two or three small issues, there had been no appreciable amount of new capital called-up; and this now necessitated arrangements for new issues to liquidate the bank loans, which it was proposed to do as soon as practicable. Additional capital powers were obtained by the Company's Act of 1918; and during the passage of this measure some doubts existed in the minds of the opposition as to whether the capital sought was not excessive. Though not in agreement with this, the Directors were nevertheless influenced to modify their demands, which were originally quite modest and justifiable. Events had, indeed, undoubtedly proved that their estimates erred on the side of being too low. The amount of loan capital available for immediate issue was £100,625, including £6200 on an old mortgage. Apart from this, there was a balance of £311,679 of share capital, *plus* a *pro ratâ* amount of loan capital, the exact amount of which would depend upon the total share capital which was issued within the period (five years, ending on May 20, 1925) specified in the Public Utility Companies (Capital Issues) Act, which provided for up to 50 p.ct. loan. Otherwise after the expiration of the period named they would lapse back (unless the Act were extended) to the usual proportion of one-third; and upon this latter basis the further available share and loan capital would be £516,204. Resolutions giving the Board the necessary authority were passed, on the proposition of the Chairman, seconded by the Deputy-Chairman (Dr. F. Stroyan, J.P.).

Demands on Gas Undertakings for Balloon Filling.

A point of some importance was raised by the refusal of Mr. J. D. Forrest, the General Manager of the Citizens' Gas Company of Indianapolis to permit his Company to provide gas for the international balloon races which had been scheduled to start from there. His contention was that it would be criminal for any gas undertaking to waste the amount of fuel involved, while conditions remain as at present. It was calculated that eight foreign entries for the international races would require 900,000 c.ft. of gas; while fifteen entries in the national contest called for no less than 1,200,000 c.ft. Some balloons expected to enter the races would require 80,000 c.ft. of gas for one filling. In the course of further discussion, it was admitted by Mr. Forrest that it would be possible to manufacture the gas if necessary; but it was his opinion that the existing scarcity of coal and oil rendered it altogether unjustifiable to do so. Recent investigations of gas companies in Indiana by the Public Service Commission showed that none of them had a reserve supply of fuel on hand, nor any prospect of building-up a reserve for the winter.

Camborne Electric Light Failures.—The electric light failed at Camborne on two occasions recently—last Saturday week, and again last Saturday—causing great inconvenience to a number of shopkeepers and business houses. Most of the shops were full of customers; and for more than an hour there was general confusion. Fortunately, all the streets are lit by gas.

Payment of Interest on Disused Lamp Standards.—As the result of a dispute between the Leighton Buzzard Gas Company and the local Council, the streets are unlighted. At the time of the air-raids street lighting was abandoned; and the Council are now wishful to resume on the old lines. This, however, the Gas Company refuse to do unless the Council pay over a sum of £112 which they claim for interest on the cost of the lamp-standards for the time during which they have remained out of use.

Rotherham and Coke-Oven Gas.—In the minutes of the Gas Committee submitted at the last meeting of the Rotherham Borough Council, there was reference to a report on the Tully gas plant, and a recommendation to appoint a Sub-Committee "to arrange, if they considered it advisable, to purchase two sets of the Tully gas plant at an estimated cost of £12,000." Alderman Gummer said they were asked to deviate from the principles so long in operation in the gas-works, without any explanation being given. He had understood during the last few years that the Committee were making arrangements with the various collieries to take all their coke-oven gas, of which there was a sufficiency in the neighbourhood to keep them fully supplied without carbonizing a ton of coal. If this was so, why expend further money on plant of any kind? They ought to have some explanation of the opposition to coke-oven gas, when they found other corporations and large gas companies adopting its use. He moved an amendment favouring the submission of a report before expending money. The amendment was adopted.

Effect of Extracting Benzole.—After a lecture in Dunfermline by Mr. Spens, of the Royal Scottish Automobile Association, on the "Production of Benzole," Mr. James Campbell, Gas Manager at Dunfermline, said he was dead-against the extraction of benzole. He knew quite well it was not the extraction of benzole that caused the bad gas during the war, but it was the extraction of benzole that choked the pipes. He would like to point out that the extraction of benzole was not a profitable business, as Mr. Spens had said. If it were the case, why did nearly every gas company cease the production of benzole immediately the Order was withdrawn? He would further venture to say that the difficulties would not be overcome. Another member of the audience did not agree with the Gas Manager when he said that difficulties could not be overcome. He (the speaker) knew how the pipes could be cleaned. He had experimented for seventeen years, and found the business quite profitable. Mr. Spens, in reply to a question, stated that the Dunfermline Gas-Works could produce about 55,000 gallons of benzole annually.

A Disastrous Natural Gas Boom.

The great natural gas boom in M'Keesport proved short-lived, and very expensive. It is calculated that between September, 1919, and the end of July this year there was an output of 14,631 million c.ft. of gas. One gusher alone had a maximum production of some 56 million c.ft. a day; but by the date just mentioned this had diminished to 37,000 c.ft. At that time the total production from the 185 producing wells was a little under 19½ million c.ft. per day, or an average of less than 15,000 c.ft. per well. Over-drilling has been advanced as the cause of the short life of the field, the outlay on which has been altogether out of proportion to the returns. It has been estimated that in leases, well drilling, stockselling, and licences, more than $20,000,000 has been spent in the field, which would represent about $20 for every dollar's worth of gas it gave. It is not difficult to understand that wide attention was directed to the field in its earlier days; for it is said that the first gusher of all [not the one already alluded to], which by July had died-down to an output of 33,000 c.ft. a day, has in its short life of twelve months produced almost 6000 million c.ft. of gas. The biggest day of the gusher was 62 million c.ft. Leases on a town lot which had previously been worth about $300 were disposed of for $20,000 while the boom lasted. Undertakings for the sinking of about a thousand wells were promoted; but some of them have never been drilled, and it is hardly likely that they will be now.

Gas for Housing Schemes.—At a meeting of the Wakefield City Council last week, Mr. H. Townsend (the Managing-Director of the Wakefield Gas Light Company) presented a scheme by which he estimated the Council could save £15,000 on 500 new houses in the Portobello housing scheme by the installation of gas fire-places and equipment. On the recommendation of the Housing and Town Planning Committee, the meeting decided that the City Housing Architect should go into the matter with Mr. Townsend, and report to the Committee.

Price of Petrol Reduced.—As from last Monday, the price of petrol was reduced 3d. per gallon throughout the country, and kerosene illuminating oil 1d. per gallon. The prices of petrol are now: First quality, 4s. 0½d. per gallon; second quality, 3s. 10½d. per gallon. "The Times" says that "there is a decided impression abroad that the recent activities of the various Committees of the Fuel Research Board, from whom a report is expected within a few days, have influenced the Petrol Companies in this startling decision. The possibilities of Empire-produced alcohol are by no means exhausted. It is not likely that an efficient spirit can be produced at anything like pre-war petrol prices; but there are grounds for hoping that it may eventually be feasible to put on the market a fuel which can be sold at a price that would undercut the present abnormal price of petrol. Those who have followed the work of the Fuel Research Board are not entirely astonished at this sudden fall in price. What surprises them is the reason alleged by the Oil Company—that output has recently been greatly increased; and that the American market cannot absorb it."

Profit on "Beatrice" Gas Stoves.

At a meeting of the Kensington Profiteering Committee on Wednesday evening last, it was reported that the case before the Committee about twelve months ago had now been investigated by the Board of Trade. The matter had reference to "Beatrice" gas-stoves. It was thought then by the Committee that the price charged by the wholesalers was excessive; and they referred a case that came before the Committee to the Board of Trade. Notification was given them by the Board of Trade that the matter would be investigated. The stoves, it appeared, were manufactured by a Stafford firm; the cost to them for the stoves being 5s. 6d. each. They were sold at this price to the wholesaler, who sold them at 8s. 6d, to the retailer, who, in turn, charged the public 12s. 6d. each. The profit to the manufacturer was 12 p.ct., the wholesaler's profit was 25 p.ct., and the retailer's profit was about 33⅓ p.ct.; and the Investigation Committee came to the conclusion that no unreasonable profit had been charged by the wholesaler. The Chairman (Mr. W. H. Marler) said, if his memory served him right, when the case was referred to the Board of Trade, the Committee were endeavouring to break down a "ring," which they were of opinion was a handicap to the retailer. This was why the case was referred to the Board of Trade, who had taken a lot of time to settle the matter.

Gas for Traction Purposes.—During the autumn provincial meeting of the National Council of the Commercial Motor Users' Association, Mr. Shrapnell-Smith referred to the question of substitutes for petrol. He said he looked with the greatest favour on the use of gas under compression; but the position in this respect was governed entirely by the coal situation. If the existing uncertainty as to the production of coal were removed, he anticipated considerable use of gas under compression for traction purposes.

Bognor Gas Company's Increased Charge Application.—The Clerk to the Bognor Urban District Council informed the members that the Gas Company were applying to the Board of Trade for power to increase their charges to 8s. 4d. per 1000 c.ft. The Council had a good case in opposition, especially as the increase was estimated by the Company upon figures which, in his opinion, would never be attained so far as their expenditure was concerned. The General Purposes Committee reported that the Clerk had been instructed to submit to the Board of Trade a representation in opposition to the application.

South Suburban Company's Debenture Issue.—Instructions from the Directors of the South Suburban Gas Company have been received by Messrs. A. & W. Richards to offer at par £150,000 of 7 p.ct. debenture stock, to be redeemed at par on June 30, 1930. The interest on the existing debenture stock and on the £150,000 now being raised, requires £28,941 per annum; and the whole of this interest forms a first charge on the net revenue of the Company, which amounted for the year ended Dec. 31 last to £56,319. Applications have to be sent in to Messrs. Richards, at No. 37, Walbrook, E.C., by the morning of Tuesday, the 19th inst.

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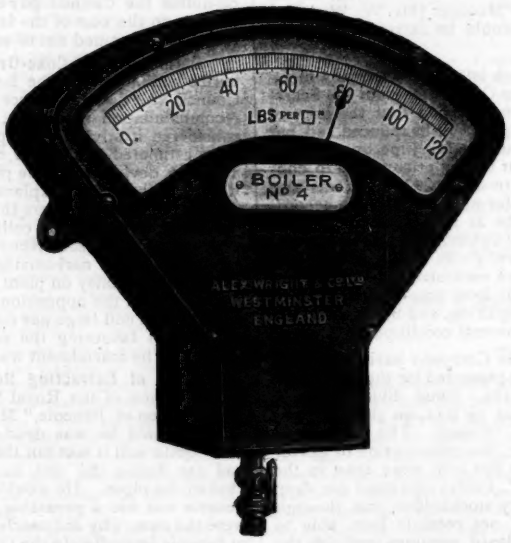

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Strike at Merthyr Tydfil.—The gas-workers at Merthyr Tydfil same out on strike last Saturday against the employment of non-unionists. Following upon the friendly intervention of the Ministry of Labour, the strike was settled by the agreement of three non-unionists to join the Union.

Ellesmere Port Gas-Works.—At a recent meeting of the Urban District Council of Ellesmere Port, the Clerk reported that, for the half year, the gross profit on the gas-works amounted to £5352, leaving a net profit of £102. A recommendation to reduce the price of gas for engines to 4s. 9d. per 1000 c.ft. was approved.

Rugely Gas Company's Dividends.—Dealing, in a letter to the local Urban District Council, with the necessity for a proposed application to the Board of Trade under the Temporary Increase of Charges Act, the Rugely Gas Company state that the rate of dividends paid to the shareholders for the three years immediately preceding the war was 5 p.ct., free of tax. The dividend in 1918 was 5 p.ct., in 1919 3¾ p.ct., and this year 3 p.ct. The Directors also point out that they require further capital for mains in connection with the Rugely and Brereton housing scheme; and they desire that shareholders should have a dividend of 5 p.ct. The Council, after fully discussing the matter, resolved not to oppose the application.

Extensions at Audley.—Mr. R. G. Hetherington recently held an inquiry at Audley, concerning an application by the Urban District Council for sanction to borrow £15,000 for the purpose of the gas undertaking. The Clerk (Mr. J. J. Nelson) stated that the Kidsgrove Gas Company had lighting powers for the whole parish of Audley; but they were not in a position to supply Audley itself with gas. The Council had entered into a contract with Messrs. Sugden, of Leeds, for the erection of retorts; and this work was being proceeded with. They were practically in the position of having to reconstruct the works. In the opinion of the Council, when the extensions had been completed, the works would be capable of a very considerably larger output. There was no opposition to the application

The Lighting of the Cenotaph.—The Office of Works have submitted to the Westminster City Council proposals for the lighting of the Cenotaph in Whitehall by four lamps on columns of a special design. The lighting in Whitehall is provided by 1800 c.p. high-pressure gas-lamps. The design of the four new lamps was originally for electric light; but the Office of Works subsequently decided that gas should be used, and modified the design accordingly. While agreeing to the proposed re-arrangement of the lighting in Whitehall, the Works Committee of the City Council recommend that the Office of Works be informed that, in the opinion of the Council, there would appear to be no necessity to incur expense in the use of a special type of column. The City Council will undertake the maintenance of the lamps. The Committee consider that the difference in the designs of the special column and the Council's standard type is not sufficient to warrant the expense of making new columns.

Naphthalene Trouble at Newport (I.W.)—The General Purposes Committee of the Newport (I.W.) Town Council, reporting upon the defective supply and quality of gas, say that the Manager of the Gas Company (Mr. F. E. Cox) attended and stated that in parts of the town new and larger mains were required, and that the Company had the matter in hand. As an after-effect of war conditions deposits of naphthalene had formed in the mains, which affected the pressure of gas supplied; but steps were being taken by him, as a result of which it was hoped by degrees to get rid of these deposits, and consumers would then receive their normal pressure of gas. He assured the Committee that the quality of the gas now was as good as that formerly supplied, and that nothing was being extracted from the gas. It was suggested to the Manager that the Company might issue a leaflet to consumers explaining the present position, and the steps being taken to improve matters; and he promised that the suggestion should receive consideration.

It is reported that a large South American firm, now in the market for a gas and water plant, received a quotation from a British firm, the price being £160,000, with delivery in two years. This was considered too high; but the chief objection was the time required to complete the contract. So the representative went further afield, and sought tenders from foreign countries. A day or two ago he received the quotation of a German firm. It was for £90,000, and delivery in three months.

It will be seen from an announcement which appears elsewhere that Messrs. Alder and Mackay, Ltd., have now re-opened their Bradford works; and deliveries of meters from there can be made all over the district by means of the firm's motor-wagons. The premises were taken over by the Government during the war; and, in consequence of the large amount of war work they were compelled to undertake, it is only now that Messrs. Alder and Mackay find themselves in a position to re-open the works.

The British Engineering Standards Association, of No. 28, Victoria Street, S.W., have prepared a new edition of the lists of British standard rolled steel sections for structural purposes, which have recently been revised by the Association. It may be recalled that the original lists were issued in 1903, and comprised 166 sections. They were extensively adopted by users and steel-makers; and in 1913, the last normal year prior to the war, returns supplied to the Association by the rolling mills showed that over 95 p.ct. of the output of structural shapes in this country were rolled to the British standards. The experience of the war having indicated that a fewer number of standard sections would probably meet requirements, it was decided towards the end of 1917 to revise the lists with this object in view. The total number of standard sections now included is 113—a reduction of 53 upon that in the original lists.

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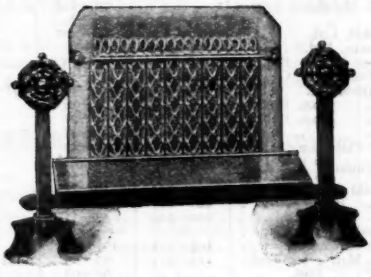
THE "Entente" Inset Gas Fire gives a cheerful impression. It is artistic in itself, and it blends harmoniously with the coal grate.



The fitting is simple and inevitably satisfactory, enabling the fitter to feel the pleasure to be derived from the knowledge of a Job well done.

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There are 296,000 gas-meters in use in Glasgow, and 260,000 appliances for cooking and heating, in addition to a large number bought from private traders and owned by occupants of the houses and shops. It is computed that 500 gas-furnaces in the city consume over 1000 million c.ft. of gas per annum.

Mr. J. H. Gardner, the Managing Director of the Colliery Investment Trust, of Swansea, makes the following appeal to British miners from New York: The United States have a coal reserve equal to the consumption for 6000 years at the rate of 500 million tons per annum. Canada has similar reserves; and there are vast undeveloped areas of coal in China, Africa, Australasia, and other parts of the world. Notwithstanding strikes, &c., in the United States, new areas are being opened up, the railway difficulties are gradually subsiding, and with proper loading accommodation and overseas freight, England may before long be importing coal at less cost than the British mining cost—thus causing serious injury to British shipping. As a friend and employer of labour, he warns miners of the consequences.

The Blackpool Gas Committee have decided that £30 be apportioned by the Gas Manager among certain members of his staff for extra services in connection with the administration of the Coal (Pit's Mouth) Prices Order, 1919.

A very unpretentious, but interesting, ceremony took place at the works of the South Suburban Gas Company, Sydenham, last Friday, when Mr. Benjamin H. Oakes completed his fifty years' service with the Company. Mr. Oakes, who is 74 years of age, has served the Company as lamplighter and stores assistant; and for the past fifteen years he has been attached to the district office. Mr. W. G. Waller (Workman Director and Chief Works Foreman) in the presence of valued friends, made a presentation of a sum of money, and expressed the earnest wish that Mr. Oakes may be spared for very many years to enjoy his pension—a pension which, thanks to the generosity of the Board of Directors, in their new scheme brought into existence this year, makes substantial provision for each employee in his old days, and, if he leaves a widow, places her above the point of actual want.

STOCK MARKET REPORT.

THE Stock Exchange has had a rather chequered week; the wind blowing first from one quarter and then from another. The tone at the opening was fairly cheerful; a calmer and more hopeful view being entertained as to a peaceful solution of the coal question. Business revived a bit in volume and gained in steadiness, and this attitude was fairly maintained through Tuesday. But next day it was all over.

The gilt-edged division was upset by rumours of a new Local Loans issue; and heavy Continental selling depressed other markets. This was aggravated on Thursday by another hitch in the coal conference; but before the close of the week there was a little improvement. In Home Government issues, the big four (except Victory) closed with slight change, Friday's figures being: Consols 45⅜-45⅞, War Loan 84½-84⅞, Founding 67½-68, Victory 73⅜-74⅛. Local Loans and Bonds fell, and new corporations were easier. Home rails were flat, except Undergrounds. Canadians irregular, and Argentine down.

In the Foreign Market, a noteworthy feature was a disposition to take up Russians, and Argentines were supported. French eased in obedience to the Exchange.

The Miscellaneous Market was in very poor form; a bad tone being set on the Continent. Rubber and Oil and many more notable issues of Industrials and Mines were pressed for sale.

Business in the Gas Market was very languid; the volume of recorded bargains showing a considerable falling off from the previous week. The total number of undertakings dealt in at all was small. Changes in quotation were few in number and, as a rule, slight in degree. In the London companies, Gas Light ordinary was 1 lower; but both South Metropolitan and Commercial were steady. In Suburban and Provincial, Ilford "A" had a fall; but Newcastle rose 1½. Imperial Continental was not much dealt in; and the quotation dropped 1. Primitiva weakened, and the ordinary shares' quotation was lowered.

Bargains done for cash during the week were as follows: On Monday, Bournemouth 10 p.ct. 8¾, 9, Brighton and Hove "A" ordinary 78⅛, Commercial 4 p.ct. 55, 56½, 59, ditto debenture 45, European 7, Gas Light ordinary 52¼, 53, 53 7/16, 53½, ditto maximum 40½, 41, ditto preference 56, Imperial Continental 132½, 133⅛, Primitiva 10s., South Metropolitan 60½, 61. On Tuesday, Gas Light ordinary 52, ditto preference 55¼, 56, Imperial Continental 133 7/16, South Metropolitan 59⅛, 60⅛, 60⅜, Aldershot 4½ p.ct. debenture 50, 50½. On Wednesday, Commercial 4 p.ct. 56, Gas Light ordinary 51½, 52, 52⅛, 52⅜, 53, ditto maximum 39¾, ditto debenture 46½, 47, Hongkong and China 8 15/16, 9, Ilford "A" and "C" 80, Imperial Continental 132, South Metropolitan debenture 45, Tottenham "A" 60½, 60¾, Brighton and Hove 6 p.ct. "B" preference 74, 75. On Thursday, Gas Light ordinary 51, 51⅛, 52, 52⅛, Ilford "A" and "C" 80, Imperial Continental 130½, 131, 131½, 132, 132⅜, Primitiva 10s., South Metropolitan 60⅛, ditto debenture 45. On Friday, Commercial 4 p.ct. 58, Gas Light ordinary 51½, ditto preference 56, ditto debenture 46, Imperial Continental 130, 131, 131½, Monte Video 72, 72½, Primitiva 9s., 9s. 6d., South Metropolitan 60, 60⅛, Southampton 58, Massachusetts 4 p.ct. preference 82.

In the Money Market, the tight pinch which constrained the previous week was quickly relaxed and, with an almost daily augmentation of supplies, a condition of marked ease was finally attained on change. Discount rates soon followed suit. The Bank rate is 7 p.ct., fixed on April 27.

ANTE-WAR PRICES AND DIVIDENDS, LATEST DIVIDENDS, AND LAST WEEK'S BARGAINS.

Issue.	Share.	When ex-Dividend.	Ante-War Dividend & Bonus.	Last Dividend.	NAME.	Closing Prices, July 30, 1914.	Present Prices.	Lowest and Highest Prices of Bargains.
£			p.c.					
182,049	Stk.	Aug. 27	4	4%	Aldershot 4 p.c. Pref. .	...	56—61	...
1,551,868	,,	Mar. 26	2½	3 1/16%	Alliance & Dublin Ord.	59—64	38—43	...
374,000	,,	July 14	4	4%	Do. 4 p.c. Deb.	76—79	47—52	...
280,000	5	May 13	7½	8%	Bombay, Ltd. . . .	5½—6½	4½—5	...
50,000	10	Aug. 12	16	5%	Bourne- (10 p.c. . .	29—30	8—9	8½—9
383,110	10	,,	7	7%	mouth Gas (B 7 p.c. .	15—15½	8½—9½	...
115,000	10	,,	6	6/—	and Water (Pref. 6 p.c.	13¾—14	7½—8½	...
162,065	—	June 25	—	4%	(4 p.c. Deb.	...	62—64	...
992,045	Stk.	July 14	14	30/—	Brentford A Consolid. .	261—266	50—55	...
734,920	,,	,,	11	26/3	Do. B New . .	204—209	47—52	...
55,000	,,	,,	5	5%	Do. 5 p.c. Pref. .	109—111	68—73	...
221,400	,,	June 10	4	4%	Do. 4 p.c. Deb. .	91—93	60—63	...
214,775	,,	Aug. 27	11	7½%	Brighton & Hove Orig. .	208—213	120—125	...
244,200	,,	,,	8	5½%	Do. A Ord. Stk.	154—159	78—83	78½
1,287,500	Stk.	July 29	5	5%	Bristol 5 p.c. max. . .	...	...	...
530,000	20	Sept. 15	12½	10%	British	44—45	21—23	...
120,000	Stk.	June 25	4	4%	Do. 4 p.c. Deb. Stk.	88—90	57—59	...
245,771	,,	,,	4	4%	Buenos Aires 4 p.c. Deb.	85—87	42—45	...
100,000	10	May 27	—	—	Cape Town & Dis., Ltd.	1½—2½	7—7½	45
100,000	10	,,	—	4½%	Do. 4½ p.c. Pref. .	4—6	5½—6½	...
100,000	Stk.	June 25	4½	4½%	Do. 4½ p.c. Deb. Stk.	70—75	56—61	...
157,150	,,	Feb. 26	5	5%	Chester 5 p.c. Ord. . .	108—110	...	...
1,513,280	,,	Aug. 12	5/9/4	30/—	Commercial 4 p.c. Stk.	106—108	54—59	55—59
560,000	,,	,,	5½	26/3	Do. 3½ p.c. do.	103—105	47—52	...
475,000	,,	June 10	3	3%	Do. 3 p.c. Deb. Stk.	69½—71½	45—47	45
800,000	,,	Dec. 11	4	—	Continental Union Ltd.	76—79	27—32	...
200,000	,,	,,	7	—	Do. 7 p.c. Pref.	115—118	40—50	...
51,600	,,	Aug. 27	14½	10½%	Croydon A 10 p.c. . .	...	125—135	...
278,400	—	,,	11½	7½%	Croydon B and C 7 p.c.	..	85—95	...
492,270	Stk.	—	6	5%	Derby Con. Stk. . .	123—125	...	...
55,000	,,	—	4	4%	Do. Deb. Stk. .	102—104	...	...
1,002,180	10	Jan. 29	10	5/0	European, Ltd. . . .	17½—18	7—8	7
16,298,975	Stk.	July 29	4/17/4	30/—	Gas (4 p.c. Ord. . .	98—102	51—54	51—53½
2,600,000	,,	,,	3½	26/3	Light (3½ p.c. max. .	76—79	39—42	39½—41
4,062,235	,,	,,	4	4%	and (4 p.c. Con. Pref.	96—99	55—58	55½—56
4,674,850	,,	June 25	3	3%	Coke (3 p.c. Con. Deb.	72½—74½	45—48	46—47
130,000	,,	Dec. 11	10	10%	(10 p.c. Bonds. .	...	...	...
82,500	,,	Sept. 15	5	3½%	Hastings & St. L. 5 p.c.	...	53—58	...
258,740	,,	,,	3½	2½%	Do. 3½ p.c.	87—89	37—39	...
70,000	10	May 13	11	8%	Hongkong & China, Ltd.	16½—16¾	8½—9½	8 1/16—9
86,600	Stk.	Sept. 15	9	5½%	Hornsey 7 p.c. . . .	...	87—89	...
131,000	,,	Aug. 12	7½	4½%	Ilford A and C . . .	151—154	79—84	80
65,780	,,	,,	6½	3½%	Do. B	115—118	64—69	...
65,500	,,	June 25	4	4%	Do. 4 p.c. Deb. . .	92—94	55—58	...
4,940,000	,,	May 14	9	4½%	Imperial Continental .	130—160	130—135	130—132½
1,235,000	,,	Aug. 12	3½	3½%	Do. 3½ p.c. Deb. Red.	84—86	82—87	...
235,242	,,	Sept. 15	6½	5%	Lea Bridge Ord. 5 p.c. .	119—121	80—85	...
2,498,905	,,	Feb. 26	10	37/6	Liverpool 5 p.c. Ord. A.	211—213	...	...
306,083	,,	June 26	4	4%	B.	146—148		
165,736	,,	Aug. 12	7/5/6	3½%	Do. 4 p.c. Pr. Deb. Stk.	...	...	...
75,000	5	June 11	6	3%	Maidstone 5 p.c. . . .	...	52—57	...
250,000	100	Oct. 1	4½	4½%	Malta & Mediterranean	4½—4¾	1½—2½	...
541,920	Stk.	May 27	4	6%	Met. of (4½ p.c. Deb.	99—101	86—93*	...
1,875,892	,,	July 29	4½	3½%	Melbourne (4½ p.c. Deb.			
529,705	,,	June 25	3½	3½%	Monte Video, Ltd. . .	11½—12	70—75	72—72½
15,000	10	Sept. 15	—	8%	Newcastle & Gatsh'dCon.	98½—99½	61—63	...
55,940	10	,,	7/14/0	5 3/10%	Do. 3½ p.c. Deb.	82—83	50—51	...
300,000	Stk.	May 13	8	8%	North Middlesex 10 p.c.	...	12½—13½	...
60,000	5	Mar. 26	10	1/—	,, ,, 7 p.c.	14—15	7½—8	...
60,000	50	Aug. 27	13	7½%	Oriental, Ltd. . . .	117—122	98—101	...
100,000	50	,,	12	6½%	Ottoman, Ltd. . . .	7½—7¾	2—3	...
249,980	5	April 29	8	—	Portsea Island, B . .	128—131	65—70	...
499,960	5	June 26	5	—	Do. C . .	118—121	50—55	...
521,600	100	June 1	4	4%	Primitiva Ord. . . .	5½—6	⅛—¼	9/—10/-
600,000	Stk.	July 29	4	4%	Do. 5 p.c. Pref. .	4½—5	1—1½	—
346,198	,,	June 25	4	4%	Do. 4 p.c. Deb. .	91—93	69—71	...
150,000	10	Sept. 30	6	6/—	Do. ,, ,, 1911	...	40—42	...
125,000	50	July 2	5	5%	River Plate 4 p.c. Deb.	85—87	38—43	...
135,000	Stk.	Aug. 27	10	5%	San Paulo (6 p.c. Pref.	10½—11	6½—7½*	...
209,984	,,	,,	10	4%	(5 p.c. Deb.	47—49	38—40	...
523,500	,,	,,	10	4%	Sheffield A	223—224	68—73	...
133,201	Stk.	Sept. 15	4	4%	Do. B	222—224	58—63	...
90,000	10	Sept. 30	9	9%	Do. C	220—222	53—55	...
6,609,895	Stk.	Aug. 12	5/4/0	30/—	Shrewsbury 5 p.c. . .	...	...	...
250,000	,,	July 14	—	5%	South African . . .	10½—11½	10½—11½*	...
1,895,445	,,	,,	3	3%	South Met. 4 p.c. Ord..	111—113	58—63	59½—61
224,820	,,	Aug. 27	8½	3%	Do. Pref. . .	...	91—93	...
1,087,795	,,	July 29	6	3½%	Do. 3 p.c. Deb..	72½—74½	45—47	45
247,558	,,	June 25	5	5%	South Shields Con. Stk.	157—159	95—96	...
647,740	,,	May 13	7½	3½%	S'th Suburb'n Ord. 5 p.c.	114—116	60—65	...
121,875	,,	June 25	4	4%	Do. 5 p.c. Deb. Stk.	116—118	68—73	...
120,000	,,	Aug. 12	—	3½%	Southampton Ord. . .	99—102	57—60	58
782,475	,,	,,	6	2½%	Do. 4 p.c. Deb. Stk.	...	59—61	...
181,255	,,	June 10	4	4%	Tottenham (A 5 p.c. .	135—138	60—65	60½—60¾
184,380	10	Dec. 30	5	—	District (B 3½ p.c. .	115—117	53—58	...
149,900	10	July 1	5	5%	(4 p.c. Deb.	87—89	60—63	...
236,476	Stk.	Sept. 15	5	3½%	Tuscan, Ltd. . . .	5—6	1—2	...
					Do. 5 p.c. Deb. Red.	93—95	45—50	...
					Tynemouth 5 p.c. max.	108½—109	69—71	...
					Wandsworth, Wimbledon, and Epsom—			
30,000	,,	Aug. 27	8½	47/6	Wandsworth A 5 p.c.	151—156	75—80	...
253,636	,,	,,	6½	32/6	Do. B 3½ p.c.	129—134	53—58	...
108,075	,,	,,	—	33/3	Do. C . . .	...	50—55	...
140,865	,,	,,	—	33/3	New Ordinary . . .	...	50—55	...
352,000	,,	,,	6½	26/3	Wimbledon 5 p.c. . .	117—122	43—48	...
98,000	,,	,,	6½	32/6	Epsom 5 p.c. . . .	121—126	50—55	...
88,416	,,	June 25	3	3%	3 p.c. Deb. Stk. . .	66—69	44—47	...

* Ex Div.

Leipzig is without electricity, gas, and water, owing to a strike of municipal workers.

The Carnarvon Corporation Gas Committee are applying for sanction to borrow £6775 for the installation of carburetted hydrogen gas plant, &c., at the gas-works.

Gas workers in Cairo and Alexandria went on strike last week for higher wages. It was anticipated that soldiers would be substituted for the strikers, in order that the public lighting might be ensured.

In the Blackburn Town Council, last Thursday, the Mayor (Alderman L. Cotton) said the new vertical retorts at the Greenbank Gas-Works were now well in hand, and should be available for the supply of gas in the winter of 1921.

A lightning strike of the electrical workers at the Moabit power plant, says a Reuter's message, resulted on Tuesday night of last week in a large section of Berlin being in darkness. On the following morning many factories were closed. The demand was for shorter hours.

A Reuter's message last Thursday said that Bombay was suffering from a series of strikes for better conditions. A week before that, the gas-workers came out, mainly owing to the dismissal of eight employees; and in consequence the streets at night had been without light, except for the illumination of oil lamps.

The Bradford Corporation Finance and General Purposes Committee have decided to support a resolution of the Coventry City Council, suggesting that the use of alcohol should be developed for motive power within the Empire, and that all authorities with gas plants should produce as much benzole as possible.

A meeting of the Kirkburton (Yorkshire) Urban District Council last week was attended by a deputation from the local Ratepayers' Association, who asked for an extension of the gas supply to Thorncliffe. The deputation endeavour to obtain the co-operation of the local property owners, and will interview the Gas Company.

Mr. Archibald Grant, consulting mining engineer of Hankow, on arrival at Liverpool, stated that, as an experiment, a cargo of coal had been shipped from China to Newcastle. The coal had arrived; and larger supplies could be despatched if required. It was of excellent quality; and it was quite possible for it to be sold at a cheaper rate than British coal.

On Saturday last week the members of the Halifax Branch of the Association of Engineering and Shipbuilding Draughtsmen visited the Corporation gas-works, and were particularly interested in the new vertical retorts now under erection by Messrs. Drakes, Ltd. Mr. W. B. M'Lusky (the General Manager) and members of his staff conducted the visitors, and were heartily thanked. Mr. M'Lusky said they would be glad to see them again when the new plant was working.

Messrs. Willey & Co.'s Royal Engineer Cadet Company is evidently a credit to itself and to the firm whose name it bears. At a recent concert in Exeter, the band did excellently well; and the physical drill display was very favourably commented upon. During an interval in the programme, Mrs. F. Templer Depree presented prizes won some time ago at the cadet camp at Teignmouth. Mr. Templer Depree, in a few remarks, congratulated the corps on winning the two challenge cups offered at the camp sports, where they competed with corps from bigger towns.

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No notice can be taken of anonymous communications. Whatever is intended for insertion in the "JOURNAL" must be authenticated by the name and address of the writer—not necessarily for publication, but as a proof of good faith.

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